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Original Article

Recovery and Return to Work After a Pelvic Fracture

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ABSTRACT

Background: Pelvic ring fractures (PRFs) may influence the daily activities and quality of life of the injured. The aim of this retrospective study was to explore the functional outcomes and factors related to return to work (RTW) after PRF.

Methods: During the years 2003–2012, 282 injured individuals aged 20–55 years on the date of the accident, were hospitalized and treated for PRFs in a large tertiary hospital in Athens, Greece. One hundred and three patients were traced and contacted; 77 who were on paid employment prior to the accident gave their informed consent to participate in the survey, which was conducted in early 2015 through telephone interviews. The questionnaire included variables related to injury, treatment and activities, and the Majeed pelvic score. Univariate and multiple regression analyses were used for statistical assessment.

Results: Almost half of the injured (46.7%) fully RTW, and earning losses were reported to be 35% after PRF. The univariate analysis confirmed that RTW was significantly related to accident site (labor or not), the magnitude of the accident's force, concomitant injuries, duration of hospitalization, time to RTW, engagement to the same sport, Majeed score, and complications such as limp and pain as well as urologic and sexual complaints ($p < 0.05$ for all). On multiple logistic regression analysis, the accident sustained out of work (odds ratio: 6.472, 95% confidence interval: 1.626–25.769) and Majeed score (odds ratio: 3.749, 95% confidence interval: 2.092–6.720) were identified as independent predictive factors of full RTW.

Conclusion: PRFs have severe socioeconomic consequences. Possible predictors of RTW should be taken into account for health management and policies.

1. Introduction

Pelvic ring fractures (PRFs) have increased considerably; nowadays, they represent 3–8% of all skeletal injuries with even higher mortality rates of up to 20% [1], whereas in antiquity only two out of 147 types of injuries were related to the pelvis, as described in *Iliad* [2]. The annual incidence of PRFs is estimated to be 19–37 for every 100,000 inhabitants, and 10 of them are high-energy injuries, mostly in men, and among polytrauma patients 20–25% will have PRFs [3–5]. In Greece, the very high number of motor vehicle accidents result in higher incidences of PRFs [6]. Causes also include falls or shooting incidents [7]. Treatment mostly depends on stability, and it could be conservative or surgical followed by physical and psychosocial support. Therefore, we used Tile and Young–Burgess system, which classifies injuries according to stability and direction of force that acts on the pelvis [1,8–11].

Recovery that could be defined as the process of becoming healthy after PRF is measured by generic indexes such as the 36-Item Short Form Health Survey or disease-specific instruments such as the Majeed score [12–14]. Pain most frequently reported (30–85%) and other complications such as neurologic (36–56%), sexual (12.5–52.1%), gastrointestinal, and genitourinary (4.6–33%), post-traumatic stress or, on the contrary, post-traumatic growth determine outcomes that are used to measure recovery and quality

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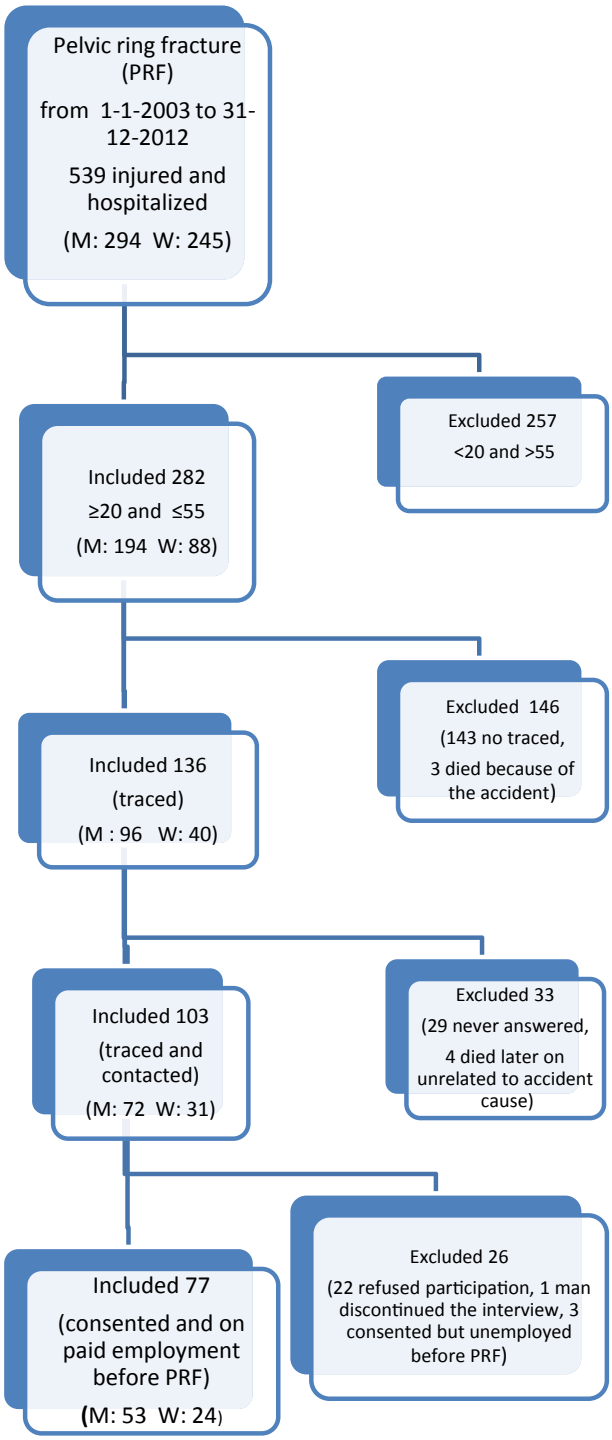

Fig. 1. Participants' flowchart. M, man; W, woman.

of life [1,14–19]. It is a fact that multiple traumas with PRF are the leading cause of disability affecting recovery and return to work (RTW) [12].

The percentage of RTW of injured individuals with PRF has been reported to range between 41% and 62.5% or even higher (˃70%) [20–22]. The unemployment rate after PRF has been estimated to be between 16% and 28%, whereas 23% of patients were forced to change jobs [17,20,23]. The injury severity score and job type are considered strong prognostic factors of RTW [22–24]. A reduction in intensity and frequency of sport activity after combined injuries of the pelvic ring and lower extremities have also been reported [25].

Several studies have examined the outcomes of PRF, but only a few studies have investigated the predictive factors in relation to RTW after PRF [14,20,22–24,26]. The aim of this study was firstly to monitor recovery and RTW after any type of PRF due to high-energy trauma in previously productive up to middle-aged individuals in a long-term follow-up, and secondly to explore the predictive factors possibly related to RTW.

2. Materials and methods

Data and contact information were collected retrospectively from the registry of the Orthopedic Clinic of the General Hospital of Nikea-Pireus and the personal archive of its clinical director, who is a coauthor of this study (NP). The hospital is one of the largest in Greece and among the few with a very high expertise in pelvic injuries. The study was approved by the Scientific Committee of Hellenic Open University, and after obtaining access permissions for the registries, the contact and baseline data collected were limited by the following inclusion criteria: (1) people hospitalized for pelvic fracture during the years January 1, 2003 to December 31, 2012; (2) age of the injured person on the accident date between 20 years and 55 years; and (3) injured individual on paid employment prior to the accident. The specific time points and age groups have been chosen in order to calculate the Majeed score in the selected time frames (see below) and to minimize both the number of current retirees (the conventional age of retirement in Greece is 65 years) and the recall bias.

A total of 539 patients with pelvic fractures have been hospitalized within the study period. Almost half of them were excluded because of the age limit. Valid contact information was confirmed for 136 (48.2%) participants, but 29 never answered the three calls on 3 different days. Four other patients (one man and three women) had died by a cause not related to the initial injury (as informed by their relatives). Thus, 103 were asked to participate in the study; however, 22 (21.4%) did not give their informed consent (two of them were unable to participate because of psychiatric disorders). One man discontinued the interview process and three were unemployed prior to PRF and thus were excluded from the study. Eventually, a total of 77 (74.8%) injured individuals on paid employment during the period of the accident who gave their informed consent were analyzed (Fig. 1).

The telephone interview was set every day between 10:00 AM and 14:00 PM and 18:00 PM and 22:00 PM between mid-March and early May 2015, and three attempts, at least for each call number, were made to get in contact with them by phone. The mean interview duration was 30 minutes (calls varied from 12 minutes to 49 minutes in length). As expected, patients with fewer complications had shorter interviews, and all interviews were carried out by a coauthor, an orthopedist (ANP).

A composite questionnaire was used including demographic, injury, and outcomes related data, and the Majeed specific questionnaire. Several answers were retrieved from the patients' records and partly cross-checked by their answers (e.g., the injury date, the patient's age at the time of the accident, the type of PRF according to Tile and Young–Burgess classification, the mechanism of the injury, and the treatment). Data were collected on the activities prior to and after the accident, including job-related variables (e.g., physical and psychological working stress), the rehabilitation type, and duration. Multiple-choice, binary, or visual analog scale (VAS) ranging from 0 to 10, question types were used. The Majeed pelvic score consists of seven subscales (pain, work, sitting, sexual intercourse, walking aids, unaided gait, and walking distance), graded from 0 to 100 (clinical grade: poor < 55,

fair 55–69, good 70–84, excellent ≥85), where higher scores represent the best outcomes, as calculated for 6 months, 1 year, 2 years, and on the interview date (7 years mean follow-up; range, 2.3–12.1) after the accident [27].

Qualitative data are presented as frequency and percentage, whereas quantitative data are presented as mean and standard deviation. Chi-square test and Fisher exact test were used to examine the independence of the qualitative variables. The fitting in the normal distribution was tested with the Kolmogorov–Smirnov test. Independent and paired sample *t* test were used where appropriate to compare mean values. Univariate analysis was used with the significance level of $p < 0.05$. To test the internal consistency of Majeed score, Cronbach α was used. In all time intervals, α values were higher than 0.7, indicating a high consistency. On univariate analysis and on the following multivariate analysis, RTW was used as the dependent variable and was defined as full if the employee returns to the same post and duties (full RTW), and as partial if any change is noted in the employment status. On the multivariate regression model that was performed, a backward selection method was used to select variables. The independent variables with statistical significance in univariate analysis and events per predictor variable (EPV) of 10 or more and no less than 6 were included in the multivariate model. According to the Majeed score, only the time frame of 6 months was used as an independent variable in the multivariate model because there is more clinical significance to predict something at the beginning and not during the action. Eventually, the independent variables with *p* values less than 0.1 were included in the final multivariate regression model. For the study purposes, PRFs were categorized using Tile classification: stable PRF as Type A ($n = 10$), partially unstable PRF as B1 (open book; $n = 26$), B2 (lateral compression; $n = 32$), and totally unstable PRF including the vertical displacement, as C ($n = 9$). In our cohort, none of the participants had been classified as B3 PRF (bilateral B injuries) [10]. All types of PRFs have been included in our study as related to high energy trauma. The SPSS software (IBM SPSS for Windows v.20 software; IBM Corporation, USA) was used for the statistical analysis.

3. Results

All 77 eligible individuals were, on average, 32.9 years old (range, 20–55 years) at the time of accident. Fifty-six (72.7%) were involved in a road traffic collision (28 were motorcyclists, six pillions, 14 drivers, and eight passengers), whereas 10 were pedestrians hit by a vehicle and 11 (14.3%) had a fall from a height (eight cases, > 3 m; three cases, < 3 m). The direction of force was lateral for 36 (46.7%), anterior–posterior for 24 (31.2%), posterior–anterior for six (7.8%), vertical force for eight (10.4%), and a combination of forces for three (3.9%) injured. The mean magnitude of the injury force was reported as high as 9.1 (in a VAS of 0 to 10). Surgical ($n = 28$; B1 = 15, B2 = 4, C = 9) or conservative ($n = 49$) treatment in combination with physio care in 21 and 25 patients took place, respectively. Comorbidities were reported by 12 (15.6%) patients prior to PRF, whereas 57 (74.0%) injured individuals presented new comorbidities. Two women (2.6%) were diagnosed with an autoimmune disease, psoriasis, and multiple sclerosis after their accidents, whereas two injured individuals (2.6%) sustained at least a second PRF during their life (Table 1).

Thirty-six individuals (46.7%) fully RTW in the same position and duties were monitored, whereas any change at work was observed in 41 individuals (53.3%). Among these, lengthy job loss accounted for 9.1% ($n = 7$); early retirement, 7.8% ($n = 6$); RTW with limitations, 11.7% ($n = 9$); RTW with new duties, 11.7% ($n = 9$); and an entirely new job, 13% ($n = 10$). Earnings remained stable in 53.3% ($n = 41$), whereas in 35% ($n = 27$) earnings were reduced and 11.7% ($n = 9$) had an income improvement. Perceived productivity was reported as stable by 41 patients (53.3%), increased in 13 patients (16.9%), and reduced in 23 patients (29.8%). Among those who never returned to work (lengthy job loss and early retirement, $n = 13$), five sustained B1, six had B2, and two had C PRF. Information related to RTW is known for 27.3%, 63.6%, 83.1%, and 100% of the patients in 6 months, 1 year, 2 years, and 7 years mean follow-up, respectively. Full RTW in 6 months, 1 year, and up to the day of the interview (7 years mean follow-up) was noticed respectively in 30%, 50%, and 60% in type A; 15.3%, 34.6%, and 62.5% in type B1; 28.1%, 46.8%, and 53,1% in type B2; and 0.0%, 22.2%, and 33.3% in type C. Majeed scores distribution was assessed by Kolmogorov–Smirnov test and, even though borderline, confirmed normality. Therefore, type A fractures had the best results of Majeed score at all times, but statistical significance among the four types of PRF was observed only 6 months after the accident (Fig. 2). It is worth mentioning that preaccident physical and psychological job strain, in a VAS 0 to 10, was reported as 6.0 and 4.6, respectively.

Overall, 37.9% of partial unstable fractures (B1, B2) and 44.4% of totally unstable PRF type C happened during work, whereas only

Table 1
Demographic, accident and injury data related to study cohort

Age on accident in y ($n = 77$)	Mean = 32.9, SD = 9.7	
Parameter	*n*	%
Sex ($n = 77$): male/female	53/24	68.8/31.2
Education level ($n = 76$)*: up to college/university –postgraduate	57/19	75.0/25.0
Marital status ($n = 77$)		
Married prior to PRF/married after PRF	21/38	27.3/49.4
Single, divorced, or widower prior to PRF/single, divorced, or widower after PRF	56/39	72.7/50.6
Sport activity: prior to PRF/after PRF ($n = 77$)	55/39	71.4/50.6
Same sport activity as prior to the accident ($n = 39$)	24	61.5
Comorbidities prior to PRF ($n = 77$)		
None/cardiovascular/musculoskeletal/other diseases	65/4/1/7	84.4/5.2/1.3/9.1
Comorbidities after the accident because of CIs and PRF ($n = 77$)		
None	20	26.0
At least one†	57	74.0
Accident site ($n = 77$): labor/free time	28/49	36.4/63.6
Stay in hospital ($n = 77$): <1 wk/1–3 wk/3–6 wk/>6 wk	23/18/21/15	29.8/23.4/27.3/19.5
Type of surgical intervention ($n = 28$)		
Anterior (ORIF or Ex. Fix)/posterior (ORIF or percutaneous screws)	15/4	53.6/14.3
Anterior + posterior	9	32.1
Time to RTW ($n = 77$): <3 mo/3–12 mo/>12 m/lost job	21/28/15/13	27.3/36.3/19.5/16.9
Type of injuries in other accidents prior to ($n = 25$)/after ($n = 7$) the study PRF		
CIs with LEx prior to/after the study PRF	10/4	40.0/57.1
CIs without LEx prior to/after the study PRF	13/2	52.0/28.6
Other pelvic fracture prior to/after the study PRF‡	2/1	8.0/14.3

CIs, concomitant injuries; Ex. fix, external fixation; LEx, lower extremities; ORIF, open reduction internal fixation; PRF, pelvic ring fracture; SD, standard deviation.

* One patient did not answer the question related to education level.

† Musculoskeletal, neurologic, genitourinary, gastrointestinal, and autoimmune diseases. Musculoskeletal diseases referred to pain, symptoms of gait and difficulties in sitting. Genitourinary diseases referred to urologic complaints and changes in sexual behavior.

‡ One patient sustained injury of pelvis prior to and after the study PRF.

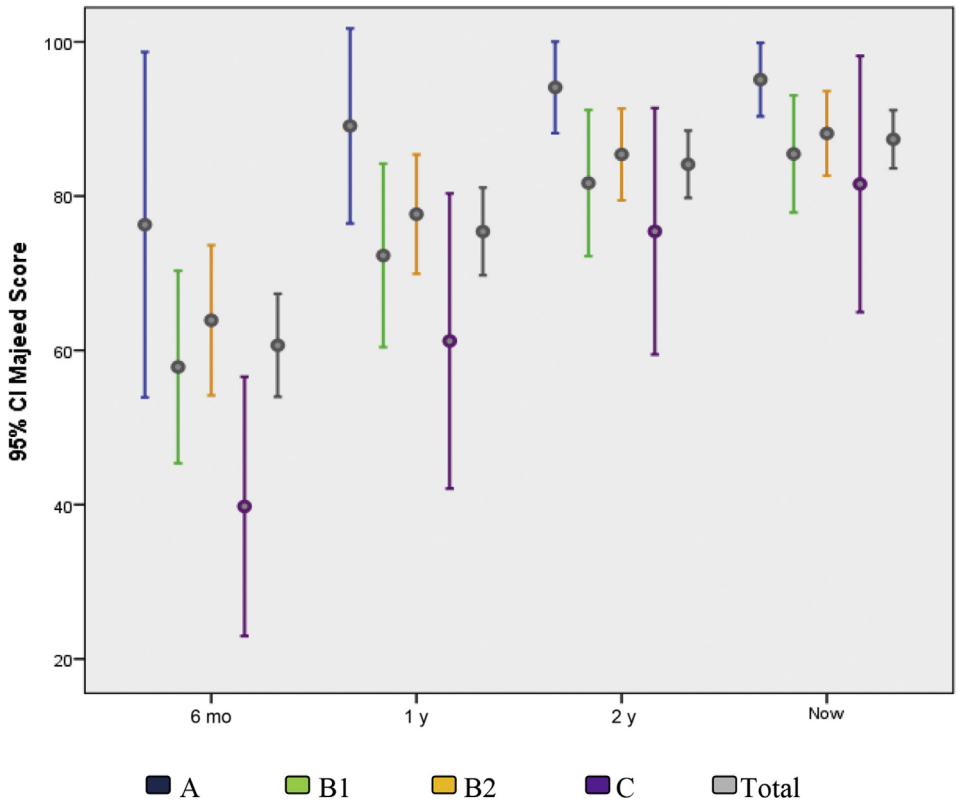

Fig. 2. Graph showing the mean Majeed score of any of the four types of pelvic ring fracture according to Tile classification (A, B1, B2, C) as well as the mean Majeed of all fractures, in the four time points [6 months, 1 year, 2 years, and day of interview (now), 7 years mean follow-up]. Only the mean values of A and C, 6 months after the accident, were considered significant during the *post hoc* trials followed by Tukey correction. CI, confidence interval.

20% of stable fractures type A were caused by an industrial accident. However, these differences did not reach statistically significant levels ($p = 0.415$). In addition, the variable of age and RTW did not reach statistical significance either ($p = 0.546$).

The site of accident, labor or not ($p = 0{,}016$), the concomitant injuries ($p = 0.008$), other than lower extremities ($p = 0.204$), stay in hospital ($p = 0.001$), time to RTW ($p < 0.001$), complications such as pain or limp ($p = 0.009$ and $p < 0.001$, respectively), disorders of sexual behavior such as dyspareunia or erection complaints ($p = 0.030$), and urologic complaints ($p = 0.018$) showed a statistically significant relationship with RTW. Those who engaged in the same sport activity as that prior to the accident had a higher possibility of reporting full RTW ($p = 0.022$). Majeed score at any time was positively related to fully RTW ($p < 0.001$ in any time), whereas an inverse relation was monitored with the magnitude of accident's force ($p = 0.007$; Tables 2 and 3).

Following a multiple logistic regression analysis, the factors that were included were related to injury data with statistical significance in univariate analysis and with the eligible EPV. So, accident site, concomitant injuries, magnitude of accident's force apart from hospitalization, and out of work time were analyzed as well as outcomes of Majeed score in 6 months' time and symptoms of pain apart from urologic and sexual complaints, as both seemed irrelevant in the clinical point of view of RTW. The symptoms of gait were also excluded as the EPV were less than six (Tables 2 and 3). Furthermore, avocation with the same sport activity was not included because by itself it indicates outcomes that direct to fully RTW. In the final step of backward regression analysis, only the accident's site-out of work [odds ratio (OR): 6.472, 95% confidence interval: 1.626–25.769] as well as the Majeed score in 6 months (OR: 3.749, 95% confidence interval: 2.092–6.720) were considered statistically significant factors, regarding their ability to predict RTW (Table 4). The calculated OR of 6.5 estimates that the odds of full RTW, following a nonlabor accident, is 6.5 times greater than the odds when PRF is caused by a labor accident. Also, the estimation of Majeed score in 6 months indicates the fact that in each clinical level (excellent, good, and fair), except the grade of poor, the odds of full RTW is 3.7 times greater than the odds in the next lower level.

4. Discussion

In this retrospective study, we have monitored functional outcomes during the recovery of young people, mostly men treated for PRF during 2003–2012. As in other studies, most PRFs happen usually to men during motor vehicle accidents, who have sustained high-energy forces acting either anterior–posterior or lateral or in combination [4,12,28]. In our study, more than one-third were motorcyclists and most received high-energy forces. Although most studies consider the unstable and partial unstable PRF, in our study all types of PRFs have been examined as high-energy trauma, showing that RTW and job loss frequencies were similar to those reported in contemporary literature [21–24,26]. Regarding the patients who have sustained a type C PRF in our study, only 33.3% have returned to their previous job in a mean follow-up of 7 years, whereas other studies show a higher percentage [17,20]. These results occur probably because in our study full RTW means a return to the same post with the same duties and not just a return to full-time employment with other duties.

In a recent study in Italy, 50 patients with PRF, either B or C according to the Tile classification, who were working prior to the injury were enrolled in the final analysis. Of this total, 40% ($n = 20$)

Table 2
Factors related to RTW (univariate analysis*)

Parameter	Return to work (RTW)		p
	Same post and duties ($n = 36$)	Any change ($n = 41$)	
Sex			
Male/female (%)	24/12 (66.7/33.3)	29/12 (70.7/29.3)	0.700
Education level ($n = 76$)			
Up to college/university, postgraduate (%)	25/10 (71.4/28.6)	32/9 (78.0/22.0)	0.506
Marital status prior to PRF (%)			
Married/single, divorced, or widower	10/26 (27.8/72.2)	11/30 (26.8/73.2)	0.926
Marital status present day (%)			
Married/single, divorced, or widower	17/19 (47.2/52.8)	21/20 (51.2/48.8)	0.726
Accident site			
Labor/free time (%)	8/28 (22.2/77.8)	20/21 (48.8/51.2)	**0.016**
Accident type			
RTC‡/pedestrian, fall from height (%)	28/8 (77.8/22.2)	28/13 (68.3/31.7)	0.351
Direction of force			
LC/APC, VS, combined (%)	20/16 (55.6/44.4)	16/25 (39.0/61.0)	0.147
Magnitude of accident's force†	8.7 (1.5)	9.5 (0.9)	**0.007**
PRF type (Tile classification)			
A/B1/B2/C (%)	6/10/17/3 (16.7/27.8/47.2/8.3)	4/16/15/6 (9.8/39.0/36.6/14.6)	0.458
Treatment			
Conservative/surgical (%)	27/9 (75.0/25.0)	22/19 (53.7/46.3)	0.052
Concomitant injuries			
Yes/no (%)	21/15 (58.3/41.7)	35/6 (85.4/14.6)	**0.008**
Concomitant injuries including or not lower extremities (LEx) ($n = 56$)			
With LEx/without LEx/without extremities (%)	9/7/5 (42.9/33.3/23.8)	22/5/8 (62.9/14.3/22.8)	0.204
Stay in hospital			
<1 wk/1–3 wk (%)	18/9 (50.0/25.0)	5/9 (12.2/22.0)	**0.001**
3–6 wk/>6 wk (%)	7/2 (19.4/5.6)	14/13 (34.1/31.7)	
Time to RTW			
<3 mo/3–12 mo (%)	16/15 (44.4/41.7)	5/13 (12.2/31.7)	**<0.001**
>12 mo/never RTW or lost job (%)	5/0 (13.9/0.0)	10/13 (24.4/31.7)	

The p values in bold are considered significant ($p < 0.05$).
A, stable; APC, anterior–posterior compression; B1, open book; B2, lateral compression; C, unstable; LC, lateral compression; VS, vertical shear.
* The values are given as the number of patients.
† The values according to VAS 0 to 10 are given as the mean ± standard deviation (SD).
‡ RTC indicates road traffic collision referring to driver, passenger, rider, and pillion.

Table 3
Factors (subjective estimates) related to RTW (univariate analysis)

Parameter	Return to work (RTW)		p
	Same post and duties ($n = 36$)	Any change ($n = 41$)	
Majeed score calculated in 4 time points after PRF*			
6 mo (SD)	77.97 (24.07)	45.44 (25.22)	<**0.001**
1 y (SD)	90.36 (14.86)	62.29 (24.97)	<**0.001**
2 y (SD)	95.67 (6.40)	73.98 (21.04)	<**0.001**
7 y mean follow-up (SD)	97.14 (4.38)	78.78 (18.71)	<**0.001**
Subjective outcome assessment, 7 y mean follow-up†			
Pain—yes/no (%)	13/23 (36.1/63.9)	27/14 (65.9/34.1)	**0.009**
Symptoms of gait—yes/no (%)	5/31 (13.9/86.1)	23/18 (56.1/43.9)	<**0.001**
Neurologic symptoms—yes/no (%)	8/28 (22.2/77.8)	15/26 (36.6/63.4)	0.169
Urologic complaints—yes/no (%)	6/30 (16.7/83.3)	17/24 (41.5/58.5)	**0.018**
Difficulty in sitting—yes/no (%)	7/29 (19.4/80.6)	14/27 (34.1/65.9)	0.148
Changes in sexual behavior—yes/no (%)	4/32 (11.1/88.9)	13/28 (31.7/68.3)	**0.030**
Gastrointestinal symptoms—yes/no (%)	4/32 (11.1/88.9)	8/33 (19.5/80.5)	0.311
Physical stress in work prior to PRF (SD)*	6.0 (2.8)	6.0 (2.8)	0.972
Psychological stress in work prior to PRF (SD)*	5.5 (3.1)	3.9 (3.8)	0.053
Sport activity prior to PRF†			
yes/no (%)	27/9 (75.0/25.0)	28/13 (68.3/31.7)	0.516
Sport activity after PRF†			
yes/no (%)	22/14 (61.1/38.9)	17/24 (41.5/58.5)	0.085
Same sport activity as prior to PRF ($n = 39$)†			
yes/no (%)	17/5 (77.3/22.7)	7/10 (41.2/58.8)	**0.022**

The p values in bold were considered significant ($p < 0.05$).
PRF, pelvic ring fracture; RTW, return to work.
* The values are given as the mean ± standard deviation (SD).
† The values are given as the number of the patients.

Table 4
Factors related to RTW (multivariate analysis)

Variable	Coefficient	OR (95% CI)	*p*
Site of accident—out of work	1.868	6.472 (1.626–25.769)	**0.008**
Majeed score in 6 mo after injury	1.322	3.749 (2.092–6.720)	**<0.001**

The *p* values in bold are considered significant.
CI, confidence interval; OR, odds ratio; RTW, return to work.

managed to maintain the same job tasks after the accident [22]. In our study, a very similar 46.7% had a full RTW, although we have included all types of PRFs.

In a univariate analysis, we found several factors to be positively related to full RTW after pelvic fracture such as out-of-work accident, lower magnitude of accident's force, and absence of concomitant injuries and/or complications (such as pain or limp, urologic or sexual disorders). Those engaged in the same sport activity as that prior to the accident and had higher Majeed scores at any time also had a higher possibility of reporting full RTW. Studies have analyzed possible prognostic factors for RTW such as the number of body areas affected or associated injuries [23,24,29]. Job type has been reported as the main prognostic factor of RTW after PRF [23], although in our study we have estimated physical and psychological strain prior to the accident and we found a relation only with psychological strain, i.e., injured individuals with lower strain prior to any accident had a borderline significantly higher possibility not to be fully RTW, possibly because of lower engagement. In contrast with a study showing that industrial accidents resulted in PRFs with lower Majeed scores [30], in our study there was no such significant relationship, although industrial accidents were related to lower possibility of full RTW, probably because they represented the most complicated cases or have better insurance coverage. Complications may affect hospitalization duration, absenteeism, and Majeed score at any time—all found to be related to full RTW. Returning to the same sport as that prior to the accident seems to be a positive predictive factor. An indication exists that after a high-energy accident, autoimmune disease could happen, possibly because of posttraumatic stress or biochemical processes, as in the case of two injured women in our study [31]. Repeated PRFs are not uncommon [32,33]. Following a multivariate logistic regression analysis, two independent key predictors related to full RTW have been identified: nonlabor accident and Majeed score in 6 months' time. Therefore, the possibilities to full RTW increase when the accident is out of work and depend on the estimation of Majeed score in 6 months. This time frame was selected because it is a short postinjury period, and there is sense in using this as a predictor factor unlike the other periods (1 year, 2 years, and 7 years mean follow-up, after the accident) where the information about RTW has been already notified in a percentage of 63.6%, 83.1%, and 100%, respectively.

Type of PRF, management plan, age, sex, marital status, and education level prior to the injury did not show significant relations with RTW, but education may affect the time spent out of work after the accident as a study referring to 61 blunt trauma (not all of them sustained a pelvic fracture) has shown [22,24,34]. Age could be a prognostic factor, as in the study of Nusser et al [23], where both pelvic and acetabulum fractures were included.

The fact that our cohort was derived from one public hospital, the high number of untraced patients, and the anticipated recall bias owing to the retrospective design of this study limited the validity of our results. Furthermore, the lost data of people who did not give their informed consent, enhances the perception that the study is characterized by bias. In addition, most of the information related to trauma was retrieved through a descriptive questionnaire that prevents the formation of a sufficient injury score, such as the injury severity score, for use as a comparable variable with other studies [22,24]. Other limitations of this study stem from the size of the sample, where in some variables the EPV are less than 10, thus weakening the reliability of the multivariate model.

However, any possible selection bias seems irrelevant to the study aims. The cohort was fairly homogeneous from the psychosocial and residential points of view, and one expert's view, and the flow of interview minimized any possible differential misclassification, e.g., in Majeed score. Additionally, the rule of 10 EPV may be relaxed, as one study has shown [35]. However, further studies with larger samples and prospective design will be useful for more reliable conclusions.

In conclusion, accident site and Majeed score at 6 months could be used as prognostic factors of RTW after an accident related to PRF. Practitioners should ask and add the information related to an accident site (labor or not) in the admission file of the patient, for future research taking into account among others on its putative prognostic power in RTW. Furthermore, the Majeed score should also be used by practitioners for the follow-up of their patients.

To the best of our knowledge, this study is one with one of the largest follow-ups in PRFs, with a mean of 7 years (range, 2.3–12.1 years) [14,20,30]. Our research underlines new predictors of RTW after PRF, adds to the prognosis of PRF, and shows aspects of the socioeconomic strain of these injuries mostly due to motor vehicle accidents. Therefore, our findings can be of significant help to countries with a high burden of motor vehicle accidents. These findings could be useful in formulating the best health management, preventive policies, and recovery strategies [36].

Conflicts of interest

The authors have no conflicts of interest to disclose.

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