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ORIGINAL

ANKLE FRACTURES IN ATHLETES. EPIDEMIOLOGICAL STUDY

FRACTURAS DE TOBILLO EN DEPORTISTAS. ESTUDIO EPIDEMIOLÓGICO

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ABSTRACT

The aim of this study is to describe and analyse, from a clinical and epidemiological point of view, the factors associated with ankle fractures caused by sports accidents and treated at the Hospital Universitario Insular of Gran Canaria between 1995 and 2005.

The total number of ankle fractures recorded was 1233, with 90 (7.3%) being caused by sports accidents, most commonly occurring in winter. The highest number of fractures occurred in patients between 29 and 33 years of age (31.1%) and the predominant sex was male (96.7%). Football was by far the most common sport (72.2%).

Three fractures were below the syndesmosis, 42 at the syndesmosis and 39 above the syndesmosis. There was a higher incidence of closed (97.8%) and unimalleolar (66.7%) ankle fractures, with the lateral malleolus being predominantly affected. 64.4% of patients had an associated injury with deltoid ligament rupture being the most common (60.3%). The mean hospitalisation time was 4.4 ± 1.9 days.

The treatment was mainly operative (93,3%) and the implant most frequently used for osteosynthesis were screws (54,8%). In 29.8% of patients performed suture of deltoid.

The median time from admission to the Emergency Department until intervention was 6.7 hours. Hospital stay was significantly shorter ($P<.001$) in the patients that were operated on earlier.

KEY WORDS: ankle fractures, sports injuries, epidemiology.

RESUMEN

El presente trabajo tiene por objeto describir y analizar, desde un punto de vista clínico- epidemiológico, los factores asociados a las fracturas de tobillo causadas por accidentes deportivos y tratadas en el Hospital Universitario Insular de Gran Canaria entre 1995 y 2005.

El número total de fracturas de tobillo registradas fue de 1233, de las cuales 90 (7,3%) fueron causadas por accidentes deportivos, siendo más frecuentes en los meses de invierno. El mayor número de fracturas se dio entre los 29 y 33 años (31,1%) y el sexo predominante fue el masculino (96,7%). El fútbol fue con mucha diferencia el deporte más frecuente (72,2%).

Tres fracturas fueron infrasindesmales, 42 transindesmales y 39 suprasindesmales. Hubo una mayor incidencia de fracturas cerradas (97,8%) y unimaleolares (66,7%), afectándose predominantemente el maléolo lateral. El 64,4% de los pacientes presentó alguna lesión asociada, siendo la rotura del ligamento deltoideo la más frecuente (60,3%). El tiempo de hospitalización medio fue de $4,4 \pm 1,9$ días.

El tratamiento utilizado con mayor frecuencia fue el quirúrgico (93,3%) y el tipo de implante principal más empleado para la osteosíntesis fueron los tornillos (54,8%). En el 29,8% de los pacientes se realizó sutura del ligamento deltoideo.

El tiempo transcurrido desde el ingreso en urgencias hasta la intervención tuvo una mediana de 6,7 horas. Los pacientes con menor tiempo transcurrido hasta la intervención tuvieron una estancia hospitalaria significativamente menor ($p < 0,001$).

PALABRAS CLAVE: fracturas de tobillo, lesiones deportivas, epidemiología.

INTRODUCTION

Ankle joint fractures are the most common bone lesions to appear at all ages, with a predominance of 75% in the productive age. Its aetiology is almost always an indirect, low-energy traumatism, frequently caused while practising sport or in daily activities (Makkozzay, 2006).

Over the last two decades, an increase in the prevalence and incidence of these fractures has occurred, both in young and active patients and in older patients (Wolinsky and Tejwani, 2002). Furthermore, they are the most common intraarticular fractures of weight-bearing joints (Bray et al., 1989) and therefore, have significant biomechanical implications when the ankle supports forces equivalent to four times the total body weight (Mann, 1987, Procter and Paul, 1982).

The ankle is the most common location for sports lesions (Garrido et al., 2004), and accounts for 20-30% of all sports lesions, particularly if the sports activity, whether recreational or competitive, involves the use of the lower body as is the case for football, basketball, etc. (Garrick and Requa, 1988, Nielsen, 1980, Salcedo et al., 2000, Schmidt et al., 1991). Amongst the latter, ankle sprains are the most common, while fractures due to ankle trauma represent 12% to 15% (Garrido et al., 2004, Olivera et al., 2001, Santonja et al., 1996, Stasinopoulos, 2004).

The aim of this study is to describe and to analyse, from a clinical and epidemiological point of view, the factors associated with ankle fractures caused

by sports accidents and treated in the Hospital Universitario Insular of Gran Canaria between 1995 and 2005.

MATERIAL AND METHOD

Ankle fracture patients who were admitted to the Orthopaedic Surgery and Traumatology Department of the Hospital Universitario Insular de Gran Canaria were retrospectively included in this study between 1 January 1995 and 31 December 2005, provided that they met the following inclusion criteria:

- Patients with clinical and radiological diagnosis of an ankle fracture sustained during the abovementioned period.
- Ankle fracture caused as a result of a sports accident.

Patients with an ankle fracture not caused by sport (traffic accident, accident in the workplace, fortuitous falls, etc.) and whose medical records were incomplete or unavailable in the hospital's records were excluded from the study.

In total, 1233 ankle fractures were recorded during the period between 1995 and 2005, with 92 being caused by sports accidents. Of these 92 cases, 2 were excluded due to not meeting the requirements established, with 90 patients (7.3%) who met the inclusion criteria finally being included in the study.

The identification of all ankle fractures was carried out by the reviewing and checking the diagnosis records of the Emergency Department, as well as the discharge diagnostics of the Orthopaedic Surgery and Traumatology Department of the Hospital Universitario Insular of Gran Canaria.

Once the cases were collected, all corresponding medical records were reviewed. To compile data, a data sheet was created in accordance with the previously defined protocol. Data compilation was structured in 5 main sections in each of the subjects, following a similar structured work protocol.

- Patient's identity data: age and sex.
- General information about the fracture: year, month, season and sport.
- Fracture characteristics: side affected, classification according to communication or non-communication with the exterior (closed or open), Pott's classification according to the number of malleoli affected (unimalleolar, bimalleolar o trimalleolar), classification according to Danis-Weber (type A below the syndesmosis, type B at the syndesmosis or type C above the syndesmosis), associated lesions and hospitalisation time.

- Treatment: type of main treatment, type of intervention, main type of osteosynthesis implant, associated implant, associated treatment and time until intervention.
- Postoperative: presence of general and/or local complications.

The variables of each section were quantitative or qualitative, and were defined by complete values and excluded alternatives, which allowed us to perform an accurate statistical treatment of the same.

The overall patient database and the statistical analysis were performed using the SPSS software version 15.0 for Windows. The information obtained from reviewing the medical records and the result of the variables calculated were compiled in the data sheet of each patient. Subsequently, the information contained in the data sheets was refined, codified and introduced into the database of the SPSS program (data entry control process). Lastly, inconsistencies and uncommon values were detected and the appropriate connections made.

Once the variables were codified, the reduction to their basic central tendency and statistical dispersion was carried out (mean, median, standard deviation, standard error, ranges and 95% confidence interval in the relevant cases) for quantitative variables along with a frequency chart and their percentages for the categorical or qualitative variables.

The variables were crossed before the selection of those whose relationship may be of interest were selected and in accordance with their quantitative or qualitative character. In all cases, the hypothesis contrast statistical tests were bilateral and were applied with a level of significance of 5% ($P < .05$).

RESULTS

We found that the mean age of the study group was 28.13 years with a standard deviation of 7.85 (range 14-48). The values found by age group reflect that more than half of the patients (65.6%) were between 19 and 33 years of age and there were only 7 cases of patients over 38 years of age (Figure 1).

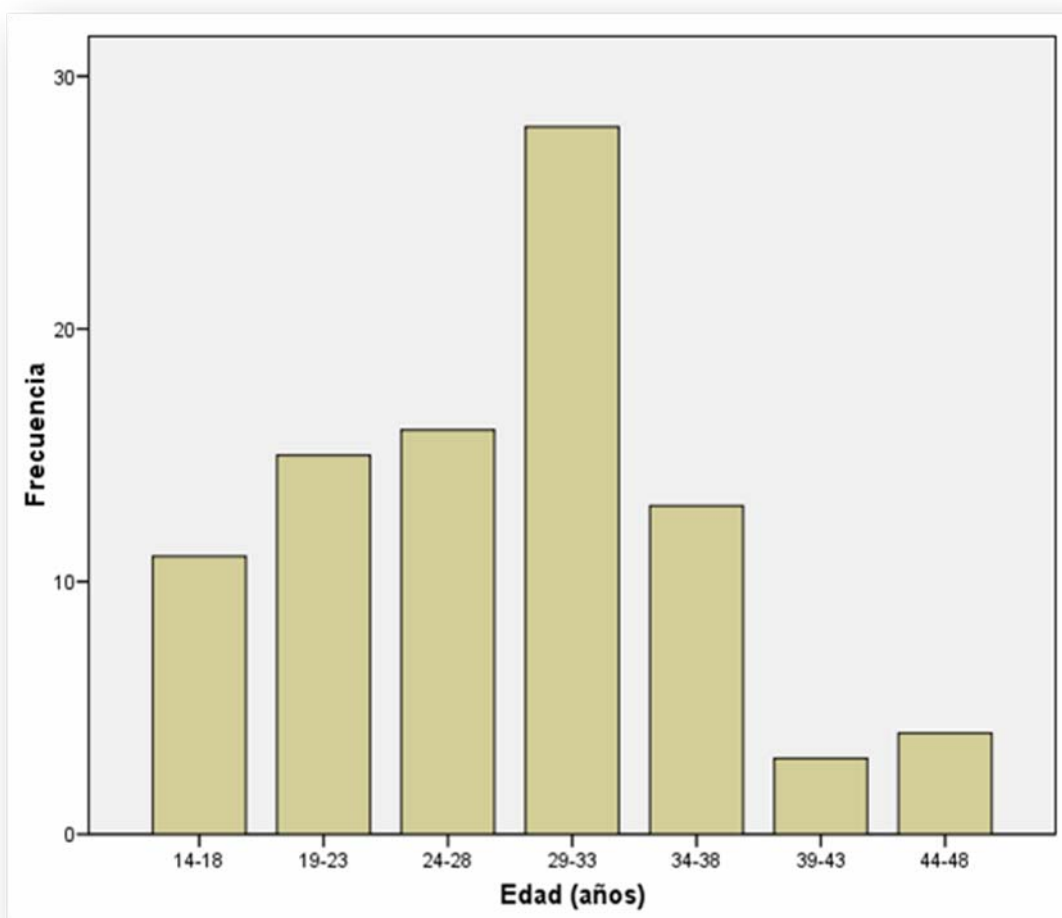


Figure 1. Distribution of patients by age group.

Figure 1 Key

Frecuencia = Frequency

Edad (años) = Age (years)

As regards sex, males were clearly predominant, with 87 of the 90 patients being male (96.7%) and only 3 being female (3.3%).

With regard to the year of fracture, there was no upward or downward trend in the number of patients throughout the period of study. We found a higher incidence in 1997, 1998 and 2001 with a total of 12 cases (13.3%) each, followed by the year 2000 with 11 cases (12.2%). By contrast, we observed that the years with lower incidence were 2004 with 5 fractures (5.6%), and 2002, in which only one fracture was recorded (1.1%) (Figure 2).

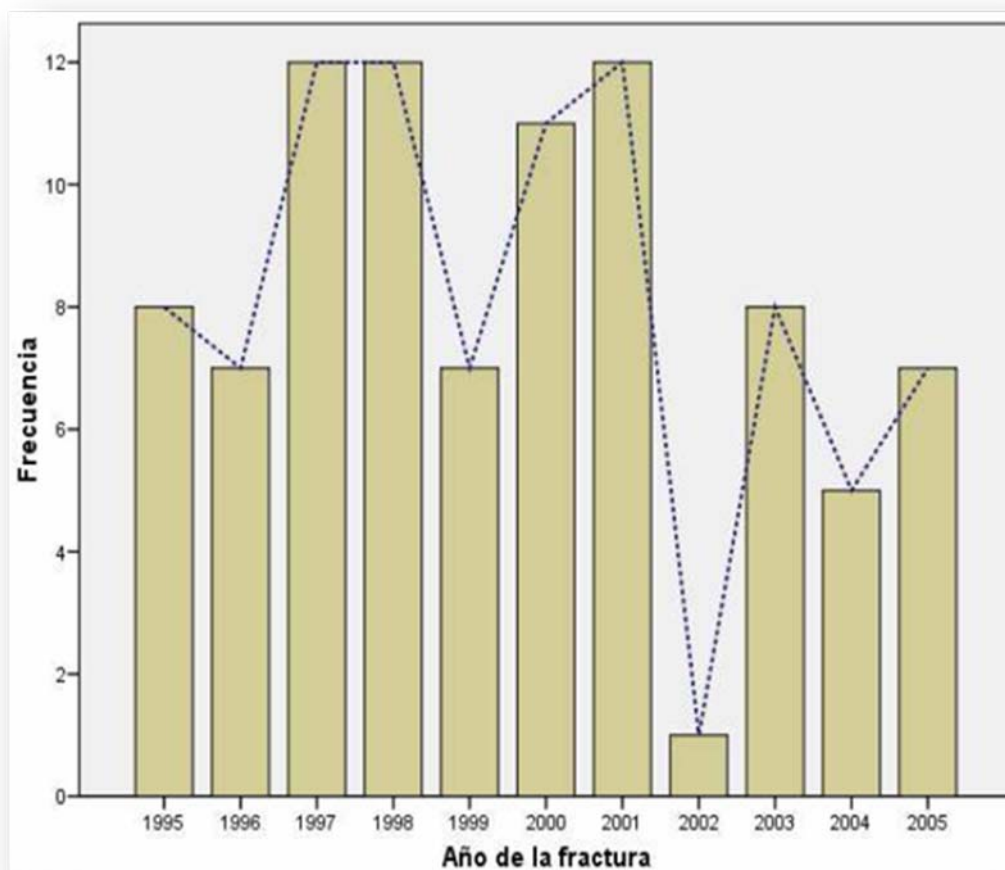


Figure 2. Distribution of patients by the year in which the fracture occurred.

Figure 2 Key

Frecuencia = Frequency

Año de la fractura = Year of fracture

Regarding the month of the fracture, we found a higher incidence in February with a total of 12 cases (13.3%), followed by April and September with 9 cases (10%) each. By contrast, we observed that the months with a lower incidence were July and October with 5 fractures (5.6%) and 4 fractures (4.4%), respectively.

Another parameter analysed was the season of the year in which the ankle fracture occurred. We found that the higher incidence of cases occurred in winter, with a total of 27 cases (30%), followed by spring with 23 cases (25.6%) and summer with 21 cases (23.3%). The season that recorded the lowest number of fractures was autumn with a total of 19 cases (21.1%) (Figure 3).

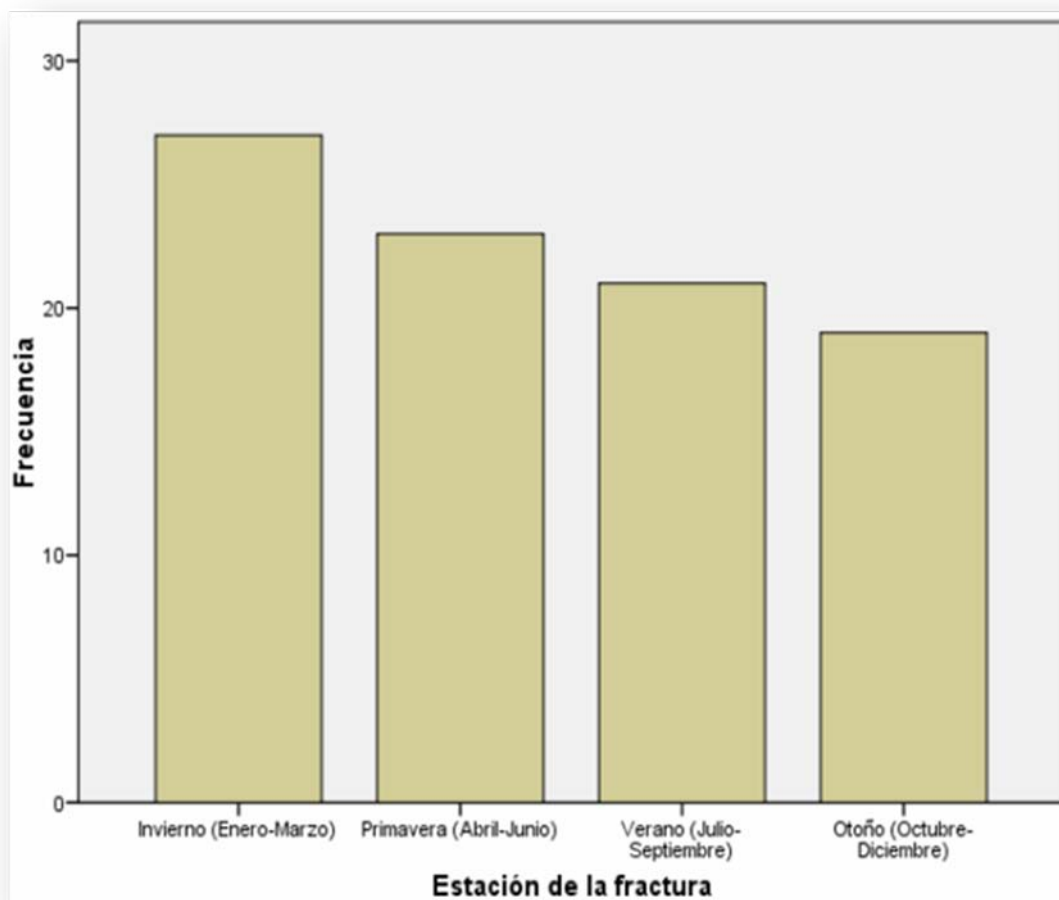


Figure 3. Distribution of patients by the season in which the fracture occurred.

Figure 3 Key

Frecuencia = Frequency

Estación de la fractura = Season of fracture

Invierno (Enero-Marzo) = Winter (January-March)

Primavera (Abil-Junio) = Spring (April-June)

Verano (Julio-Septiembre) = Summer (July-September)

Otoño (Octubre-Diciembre) = Autumn (October-December)

As regards the type of sport that caused the accident, we observed that football was by far the most common sport, and we found that it was the cause of fracture in 65 (72.2%) of the 90 patients. Other sports such as tennis, cycling and windsurfing registered a total of 2 cases (2.2%) each. Lastly, we observed a miscellaneous group of results that included futsal, squash, paragliding and equestrian sport, with 1 case (1.1%) of each. In the 15 remaining cases (16.7%) it was not possible to find out the type of sport because it was not noted in the patient's medical records (Figure 4).

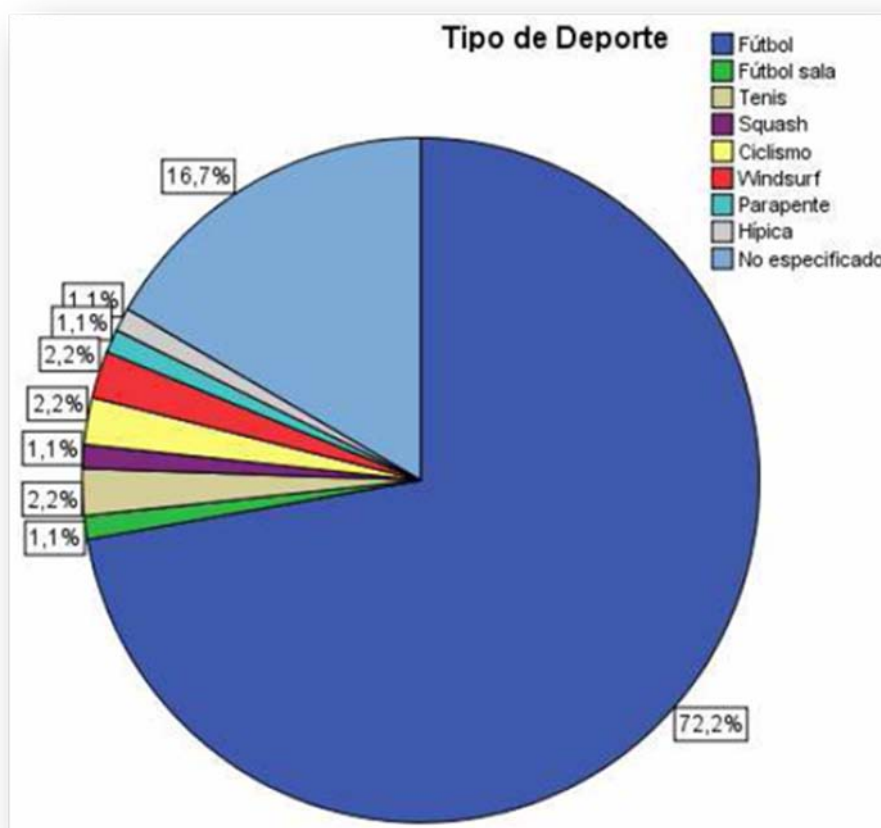


Figure 4. Distribution of patients by the type of sport that caused the accident.

Figure 4 Key

Tipo de Deporte = Type of Sport

Fútbol = Football

Fútbol sala = Futsal

Tenis = Tennis

Squash = Squash

Ciclismo = Cycling

Windsurf = Windsurfing

Parapente = Paragliding

Hípica = Equestrian sport

No especificado = Not specified

The side on which the fracture occurred was analysed and 45 (50%) fractures were found to have occurred in the right ankle, while the remaining 45 (50%) cases occurred in the left ankle, reflecting the absence of predominance by any of the 2 sides.

According to the classification developed in the material and method section, the different types of fracture found were analysed. Firstly, they were studied in accordance with whether there was communication of the fracture area with the

exterior or not, with 88 closed fractures (97.8%) and only 2 open (2.2%) being found.

This parameter was studied in more detail, with fractures being considered in accordance with the number of malleoli affected. This variable yielded a total of 60 unimalleolar fractures (66.7%), 24 bimalleolar fractures (26.7%) and 6 trimalleolar fractures (6.7%). These figures highlight the predominance of unimalleolar fractures. Analysis was also carried out on whether the external or internal malleolus was affected, finding that the former accounted for 53 cases (58.9%), while the latter accounted for 7 cases (7.8%) (Figure 5).

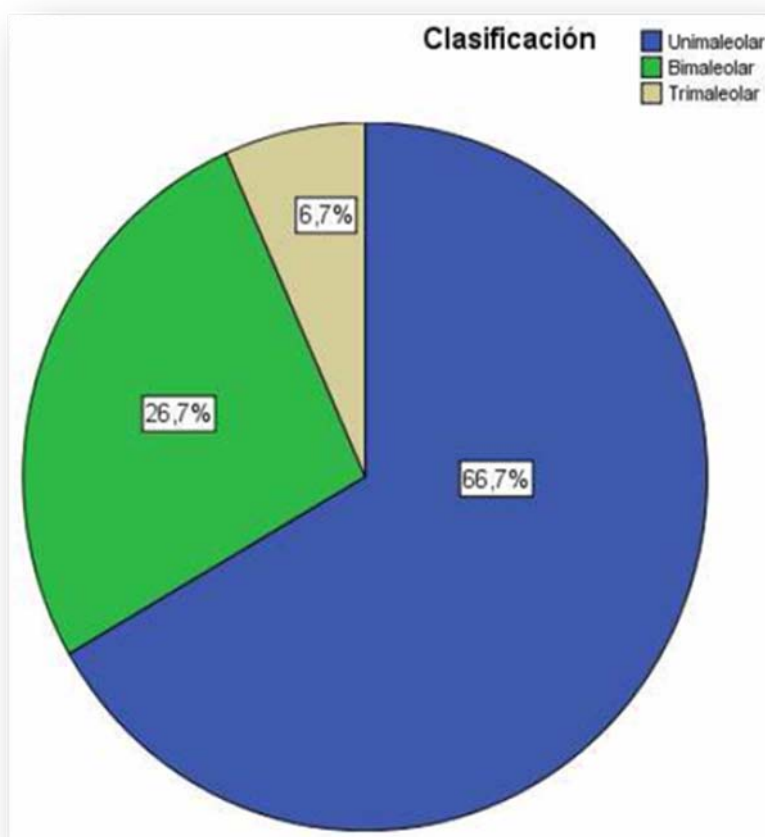


Figure 5. Classification of ankle fractures by the number of malleoli affected.

Figure 5 Key

Clasificación = Classification

Unimalleolar = Unimalleolar

Bimalleolar = Bimalleolar

Trimalleolar = Trimalleolar

We observed that, as a general trend, the average age of patients with a trimalleolar fracture was considerably higher than that of those with a unimalleolar or bimalleolar fracture, although the differences did not reach the significance threshold ($P=.053$) (Figure 6).

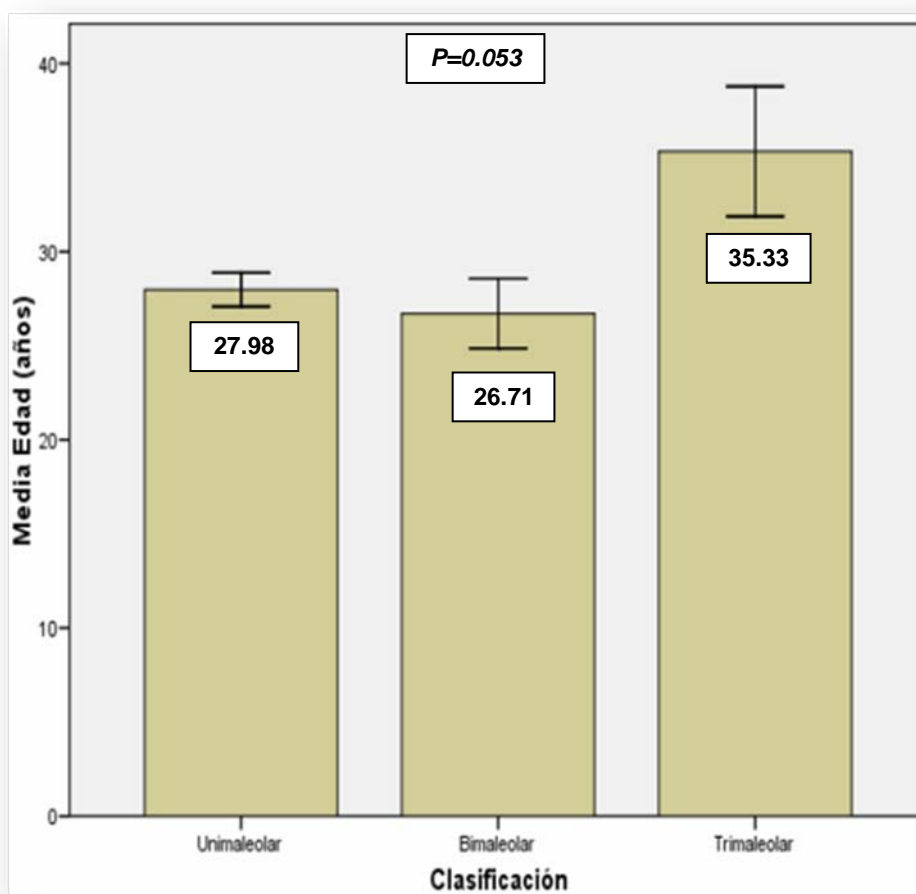


Figure 6. Mean age of patients with unimalleolar, bimalleolar and trimalleolar fracture.

Figure 6 Key

Clasificación = Classification

Media Edad (años) = Mean age (years)

Unimalleolar = Unimalleolar

Bimalleolar = Bimalleolar

Trimalleolar = Trimalleolar

Lastly, we developed a third variable through the Danis-Weber classification. The latter yielded a total of 3 fractures below the syndesmosis or type A fractures (3.6%), 42 fractures at the syndesmosis or type B fractures (50%) and 39 above the syndesmosis or type C fractures (46.4%) (Figure 7).

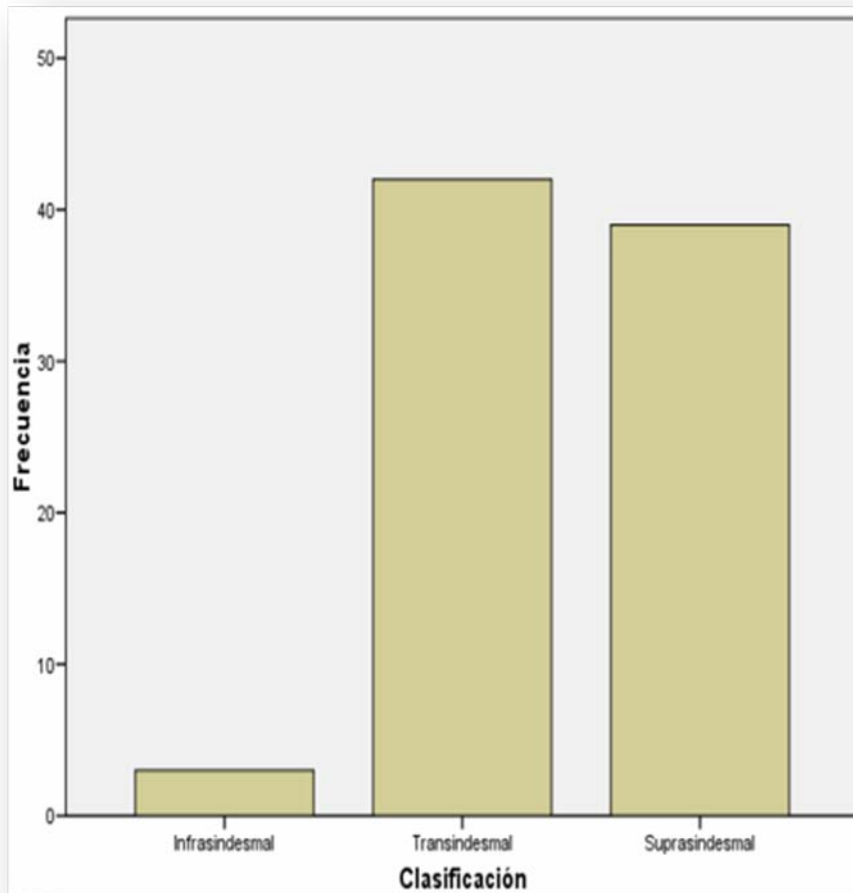


Figure 7. Classification of ankle fractures in accordance with Danis-Weber.

Figure 7 Key

Clasificación = Classification

Frecuencia = Frequency

Infrasindesmal = Below the syndesmosis

Transindesmal = At the syndesmosis

Suprasindesmal = Above the syndesmosis

Another parameter analysed was associated lesions. 58 patients (64.4%) had a lesion associated with ankle fracture, with a median of 1.0 lesions (range 1-4) (Table 1).

		Frecuencia	Porcentaje
Nº lesiones asociadas	0	32	35,6
	1	43	47,8
	2	11	12,2
	3	3	3,3
	4	1	1,1
	Total	90	100,0

Table 1. Distribution of patients by number of associated lesions.

Table 1 Key

Porcentaje = Percentage

Frecuencia = Frequency

Total = Total

Nº lesiones asociadas = Nº associated lesions

With respect to the type of lesion, we found that the rupture of the deltoid ligament was the most common associated lesion. It presented in isolation in 23 patients (39.7%). Furthermore, we observed it in combination with other lesions in 12 patients (20.6%). Tibiofibular dislocation or subluxation was the second type of associated lesion in order of frequency. It occurred in isolation in 14 patients (24.1%) and in combination with other lesions in 10 other patients (17.1%).

Hospitalisation time was the last of the parameters evaluated in the fracture characteristics section. Firstly, it was analysed as a quantitative variable, finding that the mean stay of these patients was 4.4 days with standard deviation of 1.9 (range 2-12). This parameter was also studied as a qualitative variable and it was found that in 37 cases (41.1%) hospitalisation lasted 2-3 days. In 36 cases (40%) the hospitalisation period was between 4 and 5 days. The remaining 17 cases (18.9%) had a hospitalisation period equal to or greater than 6 days (Table 2).

		Frecuencia	Porcentaje
Días de hospitalización	2-3	37	41,1
	4-5	36	40,0
	6-7	11	12,2
	8 ó más	6	6,7
	Total	90	100,0

Table 2. Distribution of patients by hospitalisation time.

Table 2 Key

Porcentaje = Percentage

Frecuencia = Frequency

Total = Total

Días de hospitalización = Days of hospitalisation

8 o más = 8 or more

In relation with the section corresponding to treatment of the fracture, the first parameter analysed was the main type of treatment performed. We observed that 84 of the 90 patients (93.3%) received surgical treatment, while the 6 remaining cases were treated conservatively. With regard to the type of intervention carried out, we found that in 77 patients (91.7%) an open reduction internal fixation was performed on the fracture.

Another parameter studied was the main type of implant used in osteosynthesis. We found that the most commonly used implants were screws, employed in a total of 46 patients (54.8%). Plates were used in 20 patients (23.8%). The combination of osteosynthesis with the plate plus screws was observed in 16 patients (19%). Lastly, in 2 patients (2.4%) screws and Kirschner wire were used together (Table 3).

		Frecuencia	Porcentaje
Tipo implante principal	Placa	20	23,8
	Tornillos	46	54,8
	Placa+Tornillos	16	19,0
	Tornillos+Agujas Kirschner	2	2,4
	Total	84	100,0

Table 3. Distribution of patients by main type of implant used for osteosynthesis.

Table 3 Key

Porcentaje = Percentage

Frecuencia = Frequency

Total = Total

Tipo implante principal = Main type of implant

Placa = Plate

Tornillo = Screw

Agujas Kirschner = Kirschner wire

As regards the type of additional associated osteosynthesis implant, we found that in 58 of the 84 patients (69%) who underwent surgery, none were used. Screws at the syndesmosis were most commonly used, and this was observed in 18 patients (21.4%). In 6 cases (7.1%), the implant employed was the screw above the syndesmosis. There were 2 cases in which a wire was used creating a tension frame in "strands".

Another parameter analysed was the type of associated treatment. In 25 cases (29.8%) the deltoid ligament was repaired by suture. We found 1 case (1.2%) in which the articular capsule was repaired. There was 1 case (1.2%) in which the two types of treatment were associated.

The time from admission to the emergency department until the intervention was the last of the parameters evaluated in the treatment section. Firstly, it was analysed as a quantitative variable, and it was found that the median in these patients was 6.7 hours (range 1-192). This parameter was also studied as a qualitative variable, and it was found that in 47 cases (56%) intervention was performed in the first 8 hours. In 19 cases (22.6%) the time until intervention was between 9 and 16 hours and in 4 cases (4.8%) it was between 17 and 24 hours. In the 14 remaining cases (16.7%) intervention was after 24 hours (Figure 8).

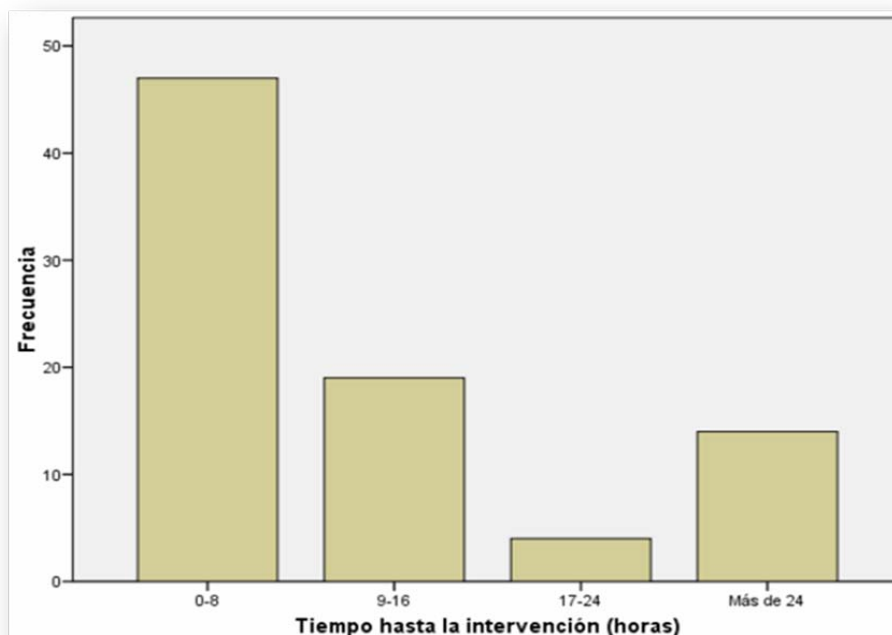


Figure 8. Distribution of patients by time until intervention.

Figure 8 Key

Frecuencia = Frequency

Tiempo hasta la intervención (horas) = Time until intervention (hours)

Hospital stay was shorter in the patients that were operated on earlier, resulting in a positive correlation between the variables ($P<.001$), but a low strength of association (correlation coefficient $r=0.3$). Likewise, the relationship between these two variables grouped by categories was analysed, and there was a statistically significant difference in the admission days, with the group undergoing intervention within the first eight hours having fewer hospitalisation days ($P=.024$) (Figure 9).

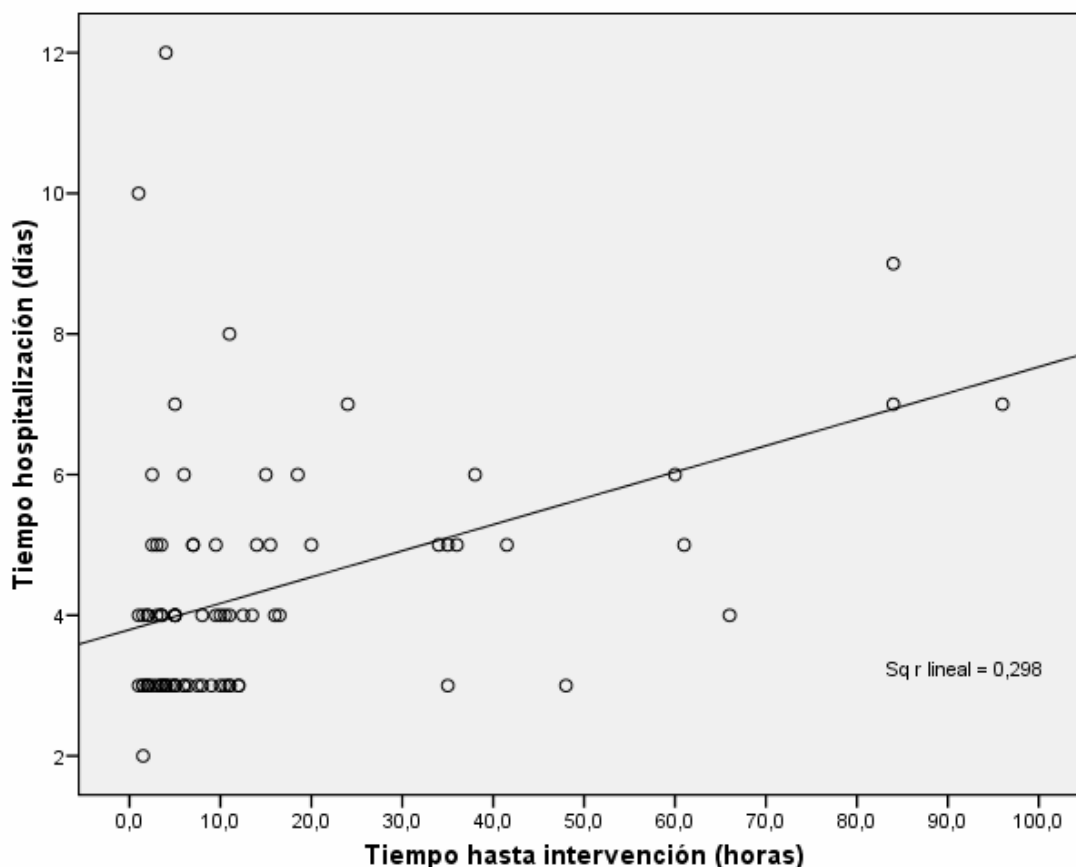


Figure 9. Relationship between the time until intervention and the hospitalisation time in the patients studied

Tiempo hospitalización (días) = Hospitalisation time (days)

Tiempo hasta intervención (horas) = Time until intervention (hours)

Sq r lineal = Linear r-squared

The postoperative section was the last to be evaluated. We observed in the group of patients that underwent surgery that no general complications appeared. Only one patient (1.2%) presented a local complication, consisting of a superficial infection of the surgical wound that required antibiotic treatment and was resolved satisfactorily.

DISCUSSION

The mean age of patients with an ankle fracture studied was higher than that observed in other epidemiological studies published involving athletes (Badekas et al., 2009, Garrido et al., 2005, Viribay et al., 2005).

The values found for age groups reflect that a higher number of fractures occurred in patients between the ages of 29 and 33, followed by those between

24 and 28 years of age, and these results are similar to those observed in other series published (Garrido et al., 2005, Jiménez, 2007, Ruiz-Caballero, 1996). This may be due to the fact that people in these age groups are both physically and financially more active and as such, they have a higher risk of presenting this type of lesions due to daily life, sports or car traumatismos (Crenshaw, 1995, Chapman, 1986, Rockwood and Green, 1996), along with the existence of a greater increase in sporting activity in these ages (Garrido et al., 2005).

In terms of sex, there was a clear male predominance. These findings coincide with those obtained in various studies of national and international literature (Acosta, 2006, Badekas et al., 2009, Carbajal et al., 1997, Czarnitzki et al., 1993, Chapman, 1986, Dahnners, 1990, Jiménez, 2007, Lampasona, 1999, Leyva et al., 1996, Ruiz-Caballero, 1996, Viribay et al., 2005, Zuqui et al., 1997). Nevertheless, Garrido et al (2005) in a study of 256 patients with sport and non-sport-sustained ankle lesions observed that, although in general the predominant sex was male, when the non-sport-sustained lesion subgroup was analysed separately, there was a greater incidence in females. The studies by Maestro et al. (1995), Pereira et al. (2002) and Preciado et al. (1999) concur with this result.

According to some authors (Garrido et al., 2005, Marante et al., 2002), male athletes get injured more frequently than females. These data concur with those of our study, and may be due to the fact that sport is predominantly practiced by males (Viribay et al., 2005), although social factors that make that women practice sport less than men should also be considered.

As for the distribution of fractures by the year in which they occurred, we did not observe any upward or downward trend in the number of fractures throughout the study period. This more or less regular successive alternance in the frequency of fractures during the study period was interrupted in 2002 due to a sudden decrease in the number of fractures. We attempted to justify the aforementioned decrease by obtaining information about the potential existence of some environmental or social factor that may have led to this decrease in 2002. However, we were unable to establish any link in this regard.

We found that in the first quarter of the year (winter), more cases of ankle fractures were registered. The existence of seasonal variations was described by Viribay et al. (2005), who performed a study on the prevalence of sports lesions in the emergency department and found a clear increase in the number of cases registered in the winter months compared to the summer period. According to these authors, this difference may be influenced by the fact that during the winter months, which coincide with the school and work periods, the practice of sport is not only more common but also more routine since it is part of both the activities in the official curriculum and outside the curriculum, and leisure or rest periods of people in the world of work.

As with our series, Ruiz-Caballero (1996) in his retrospective eight year study on 60 athlete patients with ankle fractures, found that the most common sport was football (70% of the cases). Various studies (Conti, 1999, Garrido et al., 2005, Viribay et al., 2005), show in their respective series how the number of lesions caused by football constitutes the highest percentage in comparison with the rest of the sports. The type of lesion and its frequency are strongly related to the intrinsic characteristics of the society that we study, since these characteristics condition their habits and these habits condition their sports (Garrido et al., 2005).

There was a higher frequency of closed ankle fractures with respect to open ankle fractures, which were in the minority. These results were also observed by other authors (Czarnitzki et al., 1993, Lampasona, 1999, Pereira et al., 2002, Ruiz-Caballero, 1996). Court-Brown et al. (1998) remark that open ankle fractures are uncommon, representing 2%, an identical figure to that observed in our series (2.2%).

Considering the fractures according to the number of malleoli affected, we found a predominance of unimalleolar fractures, and these findings concur with those found by Badekas et al. (2009) and Ruiz-Caballero (1996) in their respective series on athletes. Nevertheless, when we consulted other studies on patients with ankle fractures caused by accidents that are not only sports accidents in literature (Carbajal et al., 1997, Góngora et al., 1997, Preciado et al., 1999), we observed results contrary to those of our series, and as such, they found a higher frequency of bimalleolar fractures.

As regards the type of fracture according to Danis-Weber, we concur with other series of literature that we consulted on the incidence of ankle fractures that found that the most common are those of type B, followed by those of type C and A (Acosta, 2006, Carbajal et al., 1997, Góngora et al., 1997, Leyva et al., 1996, Maestro et al., 1995, Pereira et al., 2002, Preciado et al., 1999, Ruiz-Caballero, 1996, Zuqui et al., 1997). In contrast to the work published by Hoines and Stromsoe (1999) on 118 patients with ankle fractures, in which a higher incidence of young people was observed in type A fractures or fractures below the syndesmosis and of adults with type B fractures or fractures at the syndesmosis, in our study, we did not observe significant differences between the type of fracture according to Danis-Weber's classification and the age of the patients.

The rupture of the deltoid ligament was the most commonly associated lesion (60.3%). Czarnitzki et al. (1993), on 263 cases of ankle fractures due to different causes, found that 30% had an associated deltoid ligament lesion, a figure that is considerably lower than that of our series.

With respect to the type of treatment performed, different studies (Acosta, 2006, Carbajal et al., 1997, Czarnitzki et al., 1993, Ruiz-Caballero, 1996) concur with

our results and display in their respective series that the treatment most commonly used was surgery.

The most employed implants were screws (54.8%). This higher frequency in the use of screws as a single osteosynthesis system was also observed in the studies by Jiménez (2007), Martín et al. (2008) and Ruiz-Caballero (1996).

In 25 patients (29.8%), the deltoid ligament was repaired by suture, and this was the most commonly used additional type of treatment. This value is higher than the 10% found by Ruiz-Caballero (1996), although it is much lower than the 63% of the series by Góngora et al. (1997). The current trend is not to carry out suture of the deltoid ligament when a good reduction of the ankle mortise is obtained after carrying out osteosynthesis of the fibula (Martín et al., 2008, Maynou et al., 1997, Ruiz-Caballero, 1996, Stromsoe et al., 1995).

In most patients (83.4%), intervention was performed within the first 24 hours of hospitalisation, of which more than half was within the first 8 hours. In contrast to our series, different authors (Acosta, 2006, Maestro et al., 1995), show how in their respective studies the percentage of patients operated on before the first 24 hours constitutes a small group of all the patients studied (27 and 33%, respectively). Early or urgent treatment of ankle fractures is defended by different authors with the aim of avoiding the appearance of complications and improving the functional result (Alonso et al., 1992, Álvarez et al., 1979, Beauchamp et al., 1983, John and Davlin, 1993, Maestro et al., 1995, Ruiz-Caballero, 1996).

CONCLUSIONS

After the results obtained were analysed and following discussion of that exposed by these results, we are able to make the following conclusions:

1. The total number of ankle fractures recorded during the eleven years of the study was 1233, of which 90 were caused by sports accidents, which accounted for 7.3%.
2. The higher number of fractures occurred in patients between the ages of 29 and 33 and the predominant sex was male.
3. In the first quarter of the year (winter), more cases of ankle fractures were recorded than in the rest of the seasons.
4. Football was by far the most common sport.
5. There was a higher incidence of closed and unimalleolar ankle fractures, with the lateral malleolus predominantly being affected. Likewise, the

most common type of fractures occurred at the syndesmosis (Danis-Weber type B).

6. More than half of patients presented some lesion associated with the fracture of the ankle, with the rupture of the deltoid ligament being the most common.
7. The most commonly employed treatment was surgery. In a third of patients, in addition to open reduction and osteosynthesis, repair and suture of the lesion of the deltoid ligament were performed.
8. The mean hospitalisation time was 4.4 days. Hospital stay was significantly shorter ($P<.001$) in the patients with less time from admission to the emergency department until intervention.

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