



Appendicular joint dislocations

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ABSTRACT

This study defines the incidence and epidemiology of joint dislocations and subluxations of the appendicular skeleton. All patients presenting acutely to hospital with a dislocation or subluxation of the appendicular skeleton from a defined population were included in the study. There were 974 dislocations or subluxations over one year between the 1st November 2008 and the 31st October 2009. There was an overall joint dislocation incidence of $157/10^5/\text{year}$ ($188/10^5/\text{year}$ in males and $128/10^5/\text{year}$ in females). Males demonstrated a bimodal distribution with a peak incidence of $446/10^5/\text{year}$ at 15–24 years old and another of $349/10^5/\text{year}$ in those over 90 years. Females demonstrate an increasing incidence from the seventh decade with a maximum incidence of $520/10^5/\text{year}$ in those over 90 years. The most commonly affected joints are the glenohumeral ($51.2/10^5/\text{year}$), the small joints of the hand ($29.9/10^5/\text{year}$), the patellofemoral joint ($21.6/10^5/\text{year}$), the prosthetic hip ($19.0/10^5/\text{year}$), the ankle ($11.5/10^5/\text{year}$), the acromioclavicular joint ($8.9/10^5/\text{year}$) and the elbow ($5.5/10^5/\text{year}$). Unlike fractures, dislocations are more common in the both the most affluent and the most socially deprived sections of the population. Joint disruptions are more common than previously estimated.

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Introduction

Injuries to the musculoskeletal system are one of the commonest reasons for presentation to hospital. The epidemiology of fractures is well established.¹ However, the mechanism of injury, patient demographics, seasonal variation, incidence and epidemiology of joint dislocations and subluxations is unknown. There are numerous studies focusing on a single joint^{2–7} but none record the population incidence and epidemiology of all joint dislocations. The incidence of dislocations has been estimated from insurance data to be $42–104/10^5/\text{year}$.^{8,9} However, insurance data is subject to selection bias and may underestimate the true incidence of injury.

This study was designed to define the incidence and epidemiology of appendicular joint dislocations as accurately as possible. Secondary aims were to describe the common patterns of injury and treatment.

Patients and methods

All patients presenting acutely to the Royal Infirmary of Edinburgh, Royal Hospital for Sick Children and the Western General Hospital have their notes recorded using an electronic patient management system (TrakCare, Intersystems). This

database was searched for all terms related to dislocation or subluxation, thirty-three terms in total. Eponymous terms such as Lisfranc were also searched. This method would record all cases, even those where a dislocation was not the presenting complaint. All of these records were reviewed to remove those cases that did not qualify for the study.

The study period was one year between the 1st November 2008 and the 31st October 2009. All records of treatment and radiographs were reviewed to confirm the presence of a joint dislocation or subluxation. Only patients from the City of Edinburgh, Midlothian and East Lothian were included in the incidence and epidemiology analysis, as the population in these regions is clearly defined. These patients represent a captive population who are exclusively treated and followed up by the three hospitals included in the study. This defined population is the same that has been used in previous epidemiology research from our institute.¹

The patient factors recorded included age, gender and postcode. Injury-related factors included the month of injury, the joint involved, the side, whether it was a native or prosthetic joint, the direction of the dislocation, whether it was an open or closed injury, if there was an associated neurological or vascular injury, if it was a first time or recurrent dislocation, associated fracture and type and where the definitive reduction of the joint took place. The presence of conclusive confirmatory radiology of the dislocated joint was recorded.

Due to local specialist referral pathways spinal and temporomandibular injuries were excluded. Population data was obtained from the General Register Office for Scotland.¹⁰ The Carstairs

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index¹¹ and the Scottish Index of Multiple Deprivation¹² were used to assess the incidence of dislocations and subluxations of joints in the context of the patients' social deprivation. These indices rank the location of domicile into ten deciles. Decile 1 contains the most deprived people in the population and decile 10 the most affluent.

Results

The initial search revealed 2645 cases. All notes were reviewed and those where a dislocation was not the presenting complaint were excluded. Patients not living within the catchment area were also excluded. Radiographs were reviewed to ensure the correct diagnosis. There were 974 cases for inclusion in the study. Dislocation was defined as complete discontinuity of a joint. Loss of congruity of the joint surfaces with some articular cartilage contact represented a subluxation.

The incidence of dislocations and subluxations of joints was 157/10⁵/year. The incidence in males was 188/10⁵/year and in females was 128/10⁵/year. The age and gender incidence curves are shown in Fig. 1. Males demonstrated a bimodal distribution with a peak incidence of 446/10⁵/year at 15–24 years old, and another of 349/10⁵/year in those over 90 years. Females have an increasing incidence from the seventh decade with a maximum incidence of 520/10⁵/year in those over 90 years. Joint dislocations are more common in males (M:F – 1.3:1). The distribution throughout the year for each gender can be seen in Fig. 2.

The most commonly affected joints were the glenohumeral, the small joints of the hand, patellofemoral joint, hip, ankle, acromioclavicular joint and the elbow. The number of cases and the incidence per 100,000 population of all the joint dislocations and subluxations are shown in Table 1.

There were more dislocations recorded in the most affluent decile 10 than any other group. However, when these were analysed as a true incidence per head of population there was also a peak in the most deprived decile (Table 2).

Glenohumeral joint

The glenohumeral joint has a bimodal distribution with one peak at 20–24 years in males and the other at 84–89 years in females (Fig. 3). They are more common in males (M:F – 1.4:1). When only the fracture-dislocations are analysed there is a unimodal distribution with a peak in those over 80 years (Fig. 4). Two hundred and sixty-five cases were confirmed radiologically; 249 were anterior (94%), 15 were posterior (6%) and there was 1 superior subluxation associated with a rotator cuff tear. There were no open injuries. There were 185 first time dislocations (58%), 131 recurrences (42%) and 1 chronic dislocation. Seventeen had a neurological injury (5%), eleven had axillary nerve dysfunction and six had distal neurological sensory symptoms. Sixty-eight had an associated fracture (21%); the majority of these were greater

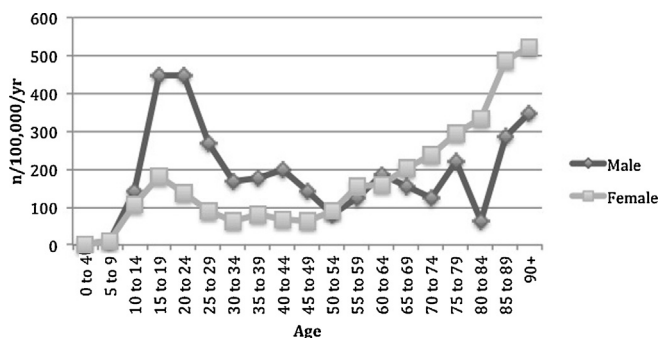


Fig. 1. Overall age and gender distribution curves.

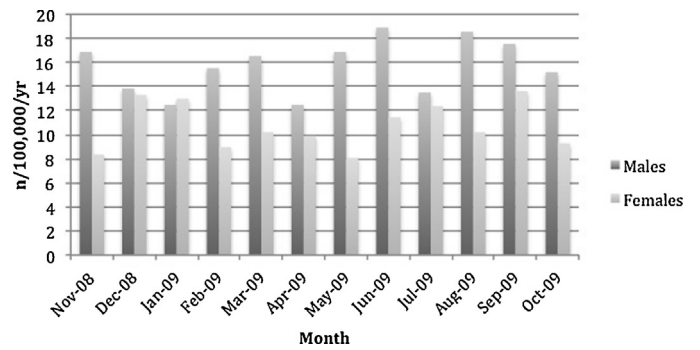


Fig. 2. Incidence by month.

tuberosity fractures, there were also bony Bankhart lesions in the young and more complex proximal humerus fractures in the elderly. The majority of shoulder dislocations were reduced in the emergency department (79%) and twelve required reduction under general anaesthesia in theatre (3%). None of these required open reduction. The remainder were either reduced in the community or resolved spontaneously.

Small joints of the hand

The small joints of the hand (metacarpo-phalangeal, proximal inter-phalangeal, distal inter-phalangeal and inter-phalangeal joints) have a bimodal distribution of 40–44 years and 90 years and over (Fig. 5) and are more common in males (M:F – 2.9:1). The distribution of the joints affected can be seen in Table 3. There were 22 open injuries (12%) and 60 fracture-dislocations (32%). They were reduced in the emergency department (69%), in the community (19%) or in the operating theatre under general anaesthesia (8%).

Patellofemoral joint

One hundred and thirty-four patients presented with reported dislocations or subluxation of the patella. Of these, only four were proven on plain X-rays as most were reduced or resolved spontaneously before radiographs were obtained. There is a unimodal distribution that peaks at age 15–19 in both males and females (Fig. 6) and there is an even gender distribution (M:F 1:1). Seventy-four were first time dislocations and sixty were recurrences. Sixteen (12%) were reported to be reduced in the

Table 1
Number of cases and incidence of joint dislocations.

Joint	Cases (%)	Incidence/10 ⁵ /year
Glenohumeral	317 (32.5)	51.2
Digits (MCPJ to DIPJ)	185 (19.0)	29.9
Patellofemoral	134 (13.8)	21.6
Prosthetic hip	114 (11.7)	19.0
Ankle	71 (7.3)	11.5
Acromioclavicular	55 (5.6)	8.9
Elbow	34 (3.5)	5.5
Toes (MTPJ–DIPJ)	33 (3.4)	5.3
Carpometacarpal	9 (0.9)	1.5
Lisfranc	4 (0.4)	0.6
Tibiofemoral	3 (0.3)	0.5
Perilunate	3 (0.3)	0.5
Distal radio-ulnar	2 (0.2)	0.3
Sternoclavicular	2 (0.2)	0.3
Subtalar	1 (0.1)	0.2

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