

Injuries Presenting to an Australian Sports Medicine Centre: A 12-Month Study

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Abstract:

Objective: To document the conditions seen by medical practitioners at a multidisciplinary sports medicine clinic during a 12-month period on the basis of site of injury, pathology, and sport played.

Design: A coding system for anatomical region, pathology, and sport played was designed.

Patients: The total number of patient diagnoses coded and entered for analysis was 2,429.

Results: The most common sports involved were Australian football 322 (13.3%), distance running 299 (12.3%), netball/basketball 210 (8.6%), racquet sports 140 (5.8%), and track running 135 (5.6%). The most commonly injured region was the knee with 668 presentations (27.5%), followed by the upper

limb (8.8%). The most frequently diagnosed pathology was overuse/inflammation with 1,115 (45.9%). Other pathologies diagnosed were partial ligament sprains 316 (13.0%), muscle strain 99 (4.1%), compartment syndrome 85 (3.5%), and third-degree ligament tear (3.5%). The most common diagnoses seen were patellofemoral syndrome, lumbar spine disorders, rotator cuff tendinitis, lateral ligament ankle sprain, medial meniscus tear, medial collateral ligament knee sprain, lateral meniscus tear, achilles tendinosis, anterior cruciate ligament tear and sacroiliac joint inflammation.

Conclusion: A study of this nature provides valuable information both to the epidemiologist and clinician.

Key Words: Injury survey—Sports medicine center.
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Increased community participation in recreational athletic events, along with widespread media reports of sports injury care at the elite level, have prompted establishment of sports medicine centers throughout Australia to provide multidisciplinary care for injured athletes. The knowledge of epidemiology of conditions presenting to these clinics facilitates the provision of services at these centers. Analysis of sport and injury enables formulation of likely diagnoses for each presentation and other conditions requiring consideration. From the data base established, research into specific condition outcomes is possible.

Most surveys of sports injuries have focused on injury patterns in specific body regions (9) or specific sports (2,6,11). There have been no previous studies published on patients presenting to a sports medicine center in Australia.

Data taken from hospital attendances (3) cited contact sports as the greatest origin of presentation, with Australian football providing significantly greater injury numbers. The authors comment that the data are incomplete, being derived only from hospital attendances. Missing are injuries treated by sports trainers, general practitioners, allied health providers, and sports physi-

cians (7). It has been noted that sports injuries provide ~14% of presentations to general practitioners (8).

There have been a number of overseas studies citing the data from sports medicine centers. Witman et al. (12) presented data from the sports medicine clinic at Lennox Hill Hospital, New York during a 4½-year period in which 1,280 patients made a total of 2,732 visits to the clinic. The most frequently injured areas were the knee (45.5%), ankle (9.8%), and shoulder (7.7%). The sports in which injuries occurred more frequently included running (32.6%), basketball (9.7%), and tennis (9.3%). A high incidence of patellofemoral disorders (25.2%) was noted.

Galasko et al. (4) reviewed the work of a sports injury clinic based at the student health center, University of Manchester, during its first 18 months of operation. A total of 852 patients were treated. The anatomic classifications of injuries, pathological distribution, and distribution of sports were recorded. Two-thirds of the injuries involved the lower limb, with knee (24.2%), ankle (14.4%), lower leg (9.7%), and foot (7.9%) being the most common areas affected. Ligamentous injuries were responsible for 33% of the total and injuries to muscle or tendon occurred in 30% of the patients. The most common strain was the medial collateral ligament of the knee joint. More than half the injuries occurred in soccer or rugby football.

Kannus et al. (5) reported a series of 814 patient visits during a 6-month period. The three most common sports

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were soccer (13%), long-distance running (10%), and orienteering (9%). The most common sites of problems were the knee (33%), ankle (10%), and low back (9%). Sprains were the most common pathology found (28%), with a combination of tendinitis, bursitis, and fasciitis providing 27% of visits and chondral and synovial disorders of the knee providing 11%.

Chan et al. (1) reported a survey involving 2,293 patients attending a sports injury clinic in Hong Kong during a 6½-year period. Soccer (13.9%) and basketball (13.4%) were the most common sports producing injury. Knee (35.1%) and ankle (15.4%) were the most common sites, whereas the most common injuries were sprain (44.6%) and strain (16.4%).

The sports injury presentations to an Emergency Department and neighboring sports injury clinic were compared (10). The two populations differed significantly, with hospital patients tending to be younger and to have acute injuries from contact sports, with injuries to the head and upper body and upper limb. Sports injury clinic patients tended to be older, with chronic or overuse injuries to the lower limbs and spine from noncontact sports.

The aim of this study is to document the diagnoses made by medical practitioners at a multidisciplinary sports medicine clinic during a 12-month period on the basis of site of injury, pathology, and sport played.

METHODS

A system of alphabet coding was devised for anatomic region, pathological condition, and sport played. Each patient presenting to one of the medical practitioners was assessed and coded in these three areas. Coding was performed at completion of either the initial consultation or the consultation at which a definitive diagnosis was made. Information was recorded on a form, and the coding was entered into a computer for data analysis.

Olympic Park Sports Medicine Centre is a multidisciplinary sports medicine center located centrally in the city of Melbourne, Australia. It is situated ~100 m from the main athletics track in Melbourne and near the city's other major sporting facilities. The center operates 7 days a week and provides a weekend casualty and limited radiology service.

The medical practitioners are all sports physicians with postgraduate training who have attained a Fellowship of the Australian College of Sports Physicians (FACSP), or who are advanced trainees of the College proceeding to Fellowship. Approximately half the patients are self-referred, with the remainder referred by general practitioners, physiotherapists, massage therapists, and sports trainers. The survey was conducted during a 12-month period from May 1, 1994, to April 30, 1995.

RESULTS

The total number of patients' diagnoses coded and entered for analysis was 2,429. The most common sports associated with injuries are shown in Table 1. The num-

TABLE 1. Twelve most common sports

	No.	%
1. Australian football	322	13.3
2. Distance run/jog	299	12.3
3. Netball/basketball	210	8.6
4. Racquet sports	140	5.8
5. Track running	135	5.6
6. Work related	119	4.9
7. Dance	77	3.2
8. Swimming	76	3.0
9. Triathlon	72	3.0
10. Row/canoe	72	3.0
11. Aerobics	64	2.6
12. Soccer	58	2.6

ber of injuries in each region of the body is shown in Table 2. Injuries that can be classified as acute numbered 661 (27.2%), with overuse injuries numbering 1,426 (58.7%).

The most common pathologies are shown in Table 3 and the most common diagnoses seen during the survey are shown in Table 4. The most frequent presenting problem was overuse knee pain followed by acute knee injury, low back pain, shoulder pain, and shin pain.

DISCUSSION

The high incidence of Australian football injuries reflects the contact nature of the sport and the popularity of participation in Melbourne. Distance running injuries were also frequent, whereas netball is the highest participating sport among girls and women in Australia. Football (soccer) and long-distance running were also the two most common sports involved in the Finnish study (5), whereas soccer and rugby football followed by athletics were the most commonly seen sports in the British study (4). Basketball figured prominently in the New York and Hong Kong studies, reflecting its local popularity (1,12).

The distribution of injuries (Table 2) shows a distribution similar to that of the previously published studies. Comparison of this study to the previously published sports medicine center injury surveys is shown in Table 5.

The knee is the most common site of injury in all the studies, with a maximum of 45.5% in the New York study (12), which was at a sports medicine center staffed

TABLE 2. Injured region

	No.	%
Knee	668	27.5
Upper limb	455	18.7
Ankle	277	11.4
Lumbar spine	213	8.8
Medial	205	8.4
Groin/thigh	178	7.1
Lower leg	168	6.9
Foot	130	5.4
Head/neck	73	3.0
Thorax/abdomen	71	2.9

TABLE 3. The most common pathologies

	No.	%
Overuse/inflammation including		
tendinitis, bursitis	1115	45.9
1°/2° ligament sprain	316	13.0
1°/2° muscle strain	99	4.1
Stress fracture	87	3.6
Compartment syndrome	85	3.5
3° ligament tear	84	3.5
Acute fracture	62	2.6
Instability	56	2.2
Referral pain	54	2.2
Contusion	46	1.9
Impingement	45	1.8

by orthopaedic specialists. There are some difficulties comparing the different sites of injuries between different studies; however, it would seem that the shoulder, ankle, and lumbar spine are common sites of injury in all studies. The ratio of overuse (58.7%) to acute (27.2%) injuries was higher in this study than in the Finnish study (53 to 39%), with only 12.6% overuse injuries compared with 69.5% acute injuries in the Hong Kong study (1).

This increase in the ratio of overuse injuries to acute injuries over a period of time may reflect the changing nature of sport injuries. There has been a considerable increase in the amount of endurance sports played in the past 10–15 years, and this increase may be a reflection of this. The relatively high incidence of overuse injuries may also reflect the central nature of the clinic, which may attract less straightforward trauma that would tend to be treated at suburban clinics closer to the majority of recreational and sporting activities. The clinic also has specific research interests in a number of overuse conditions including stress fractures, shin pain, and groin pain.

None of the other studies record the most common specific diagnoses, although it is suggested in the New

TABLE 4. Twenty most common conditions

1.	Patellofemoral syndrome
2.	Lumbar spine/disc disorders
3.	Rotator cuff tendinitis
4.	Lateral ligament ankle sprain
5.	Medial meniscus tear
6.	MCL—tear
7.	Lateral meniscus tear
8.	Achilles tendinosis
9.	ACL—tear
10.	SI joint inflammation
11.	Plantar fasciitis
12.	Medial tibia—tenoperiostitis
13.	Patellar tendinosis
14.	Iliotibial band friction syndrome
15.	Patella fat-pad impingement
16.	Cervical spine/disc disorders
17.	Lateral elbow—tendinosis
18.	Tibia—stress fracture
19.	Overtraining syndrome
20.	Sinus tarsi inflammation

MCL, medial collateral ligament; ACL, anterior cruciate ligament; SI, sacroiliac.

TABLE 5. Comparison of surveys of sports medicine clinic attendances

Site	Melbourne 1995	U.S.A. 1981 (12) ^a	U.K. 1982 (4)	Finland 1987 (5)	Hong Kong 1993 (1)
Knee	27.5	45.5	24.2	33	35.1
Upper limb	18.7	15.6	18.4	14	25.1
Ankle	11.4	9.8	14.4	15	28.7
Lumbar spine	8.8	5.0	8.1	9	11.7
Medial	8.4	—	—	—	—
Groin/thigh	7.1	9.7	9.4	—	—
Lower leg	6.9	6.2	9.7	9	—
Foot	5.4	7.2	7.9	4	—
Head/neck	3.0	0.8	4.6	—	—
Thoracic/abdo.	2.9	—	3.3	—	—

Numbers in parentheses refer to reference numbers.

York study that patellofemoral pain is the most common presenting complaint (12).

Comparisons of tissue pathology, especially overuse conditions, between studies are extremely difficult, because different groups use different terms for similar conditions. Also, the understanding of various pathological processes involving overuse sporting injuries has increased dramatically in the past few years, and physicians are now more aware of the degenerative nature of chronic overuse conditions rather than the pure inflammatory nature. Within this clinic, the doctors have had similar postgraduate training in sports medicine under the supervision of the senior author, and although there are still some different interpretations, generally the physicians have a similar approach to the diagnosis of sporting injuries and therefore the coding.

Diagnoses may vary quite considerably from clinic to clinic. For instance, patellofemoral syndrome patients have been grouped together whereas other studies such as Witman et al (12) have differentiated between patella subluxation, chondromalacia patellae and “general patellofemoral pain.” However, this study has differentiated patellofemoral pain from patella tendinitis and patella fat pad impingement. Similarly, with problems involving the lumbar spine, these have been grouped together because it is impossible clinically to differentiate between, for instance, the lumbar disc and facet joints as a site of pain and joint sprain, muscle strain, and inflammation as the pathology. Other studies have attempted to differentiate between some of these conditions.

CONCLUSION

In this series of 2,429 patient diagnoses coded in a 12-month period, Australian football is the most common sport involved, followed by running, netball/basketball, and racquet sports. The knee is the most common site of injury. Other relatively common sites are the shoulder, ankle, and lumbar spine. The most common presentations are overuse knee pain, acute knee injury, low-back pain, shoulder pain, and shin pain. Overuse injuries are twice as common as acute injuries. The overuse/inflammation category is by far the most common pathology, followed by ligament sprain, muscle strains,

stress fractures, and compartment syndromes. Patellofemoral syndrome is the most common condition seen, followed by lumbar spine disorders, rotator cuff tendinitis, and ankle sprains.

In spite of difficulties such as establishing an appropriate coding system, relying on doctors to always enter the codes, problems with injury classification, the different interpretation of these classifications, and the bias at any clinic toward certain sports and certain pathologies, a study of this nature provides valuable information both to the epidemiologist and to the clinician.

This study is the first to document a high proportion of overuse injuries and the first to indicate that patellofemoral syndrome is the most common condition seen at a sports medicine clinic.

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