The Orchard Sports Injury Classification System (OSICS) Version 10

Katherine Rae, MBBS, FACSP and John Orchard, MD, PhD

Abstract: Injury classification systems are generally used in sports medicine (1) to accurately classify diagnoses for summary studies, permitting easy grouping into parent categories for tabulation and (2) to create a database from which cases can be extracted for research on specific injuries. Clarity is most important for the first purpose, whereas diagnostic detail is particularly important for the second. An ideal classification system is versatile and appropriate for all sports and all data collection scenarios. The Orchard Sports Injury Classification System (OSICS) was developed in 1992 primarily for the first purpose, a specific study examining the incidence of injury at the elite level of football in Australia. As usage of the OSICS expanded into different sports, limitations were noted and therefore many revisions have been made. A recent study found the OSICS-8, whilst superior to the International Classification of Diseases Australian Modification (ICD-10-AM) in both speed of use and 3-coder agreement, still achieved a lower level of agreement than expected. The study also revealed weaknesses in the OSICS-8 that needed to be addressed. A recent major revision resulted in the development of the new 4-character OSICS-10. This revision attempts to improve interuser agreement, partly by including more diagnoses encountered in a sports medicine setting. The OSICS-10 should provide far greater depth in classifications for the benefit of those looking to maintain diagnostic information. It is also structured to easily collapse down into parent classifications for those wanting to preserve basic information only. For those researchers wanting information collected under broader injury headings, particularly those not using fully computerized systems, the simplicity of the OSICS-8 system may still suffice.

(*Clin J Sport Med* 2007;17:000–000)

INTRODUCTION

The Orchard Sports Injury Classification System (OSICS) was developed in 1992 for use in a study that examined the incidence of injury at the elite level of Australian rules football, rugby league, and rugby union in Australia.[1,2] A specific sports injury classification system was desired for this study, yet the one relevant system that had been previously published in the sports medicine literature [National Athletic Injury/Illness Reporting System (NAIRS)[3]] was protected by copyright and not available for free use. The International Classification of Diseases (ICD) (version 9) was also available, but it was inadequate for classifying sports injuries, hence the development of the OSICS.

EARLIER VERSIONS OF THE OSICS

The earlier versions of the OSICS (versions 1–8) were based on a 3-digit classification, the first letter reflecting body location, the second pathology (Table 1), and the third more detailed information about that pathology (see example codes, Table 2). The third digit was either a letter or a number (eg, KL1–ACL strain of the knee). The OSICS has been published (version 3) in *Sport Health* in 1993,[4] as part of the report on football injuries to the Australian Sports Commission[2] and as an appendix to a textbook in 1995,[5] but it has not previously been published in a peer-review journal. It has been available for free download on the internet since 2002 (http://www.injuryupdate.com.au/research/OSICS.htm).

Because the OSICS has been published as an open access system, it has been used by Sports Injury Manager (http://www.sportsinjurymanager.co.uk/osics.html), Injury Tracker (http://www.injurytracker.com/), the Australian Sports Injury Data Dictionary (http://www.sma.org.au/information/ssdatadict.asp), Australian Institute of Sport, and the Australian Commonwealth Games Association. It has been used in the sports of soccer (football),[6–8] rugby union,[9–11] rugby league,[12] cricket,[13,14] and military studies.[15]

The original purpose of the OSICS was to provide a system that:

1. Reflects clinical sports medicine practice
2. Is simple and free to use
3. Allows easy mapping between old and new versions of the OSICS
4. Allows easy mapping back to main (parent) injury categories
5. Is succinct enough to be published on a handful of printed pages, so that recorders in the field can easily find the code they are seeking

Items 1–4 are as important today as they were in 1992, although the fifth objective, whilst still of some benefit, is less important if using a fully computerized surveillance system, which has become commonplace. The range of diagnoses made by a typical sports medicine practitioner has expanded rapidly in the past decade, particularly as the use of magnetic resonance imaging has become commonplace. Therefore, the required number of clinical diagnoses in a classification system has expanded. Modifications to the OSICS over time

Submitted for publication November 24, 2006; accepted March 8, 2007.
From the University of New South Wales, Australia.
Reprints: Katherine Rae, MBBS, FACSP, University of New South Wales (e-mail: johnorchard@msn.com.au).

TABLE 1. Characters Used the OSICS-10

Anatomical Site Code (Tier One)		Pathology Code for Musculoskeletal Diagnoses (Tier Two)	
Head	H	Non specific injury	X
Neck	N	Bruising/haematoma	H
Shoulder	S	Laceration/Abrasion	K
Upper arm	U	Whiplash	W
Elbow	E	Muscle injury	M
Forearm	R	Tendon injury	T
Wrist and hand	W	Joint sprains	J
Chest	C	Cartilage injury	C
Trunk and Abdomen	O	Joint dislocations	D
Thoracic spine	D	Chronic instability	U
Lumbar spine	L	Synovitis, impingement, bursitis	G
Pelvis and buttock	B	Fracture	F
Hip and Groin	G	Stress fracture	S
Thigh	T	Other stress/Over use injury	Y
Knee	K	Organ injury	O
Lower leg	Q	Nerve injury	N
Ankle	A	Vascular injury	V
Foot	F	Arthritis	A
Location unspecified	X	Other injury no elsewhere specified	Z
Other categories			
Medical	M		
Congenital	I		
Paediatric	J		
Disabled	V		
Post surgical	Y		
No presenting illness/injury	Z		

have been primarily by the addition of new classifications reflecting diagnoses deemed to be inadequately covered by the previous version (for example, some pediatric diagnoses such as traction apophysites).

The OSICS was first formally tested for reliability in 2004, when its eighth revision was compared with the International Classification of Diseases Australian Modification (ICD-10-AM), which is the current version of ICD used in Australia.[16] Despite suggesting superiority to ICD-10-AM via a higher intercoder agreement and being statistically significantly faster to use, the degree of agreement between coders for the OSICS-8 was deemed less than ideal.[16] There were several areas where coders disagreed on the classification required or were dissatisfied with the classification that they had to choose. This highlighted some specific as well as some generalized deficiencies in the system. An example of this is the OSICS-8's lack of nonspecific or other codes, for example, groin pain not otherwise specified.

TABLE 2. OSICS-8 Sample

Injury Code	Injury Description	Parent Code	OSICS-10 Translation(s)
HF1	nose fracture	HF1	HFNX
HF2	skull fracture	HF2	HFSX
HFF	fractured frontal bone	HF2	HFSF
HF3	mandible fracture	HF3	HFMX or HFMC (compound)
HF4	fractured facial bone	HF4	HFXX
HFE	fractured orbital socket	HF4	HFEX or HFEF or HFEM or HFEZ
HFM	fractured maxilla	HF4	HFUX
HFZ	fractured zygoma	HF4	HFZX

DEVELOPMENT OF THE OSICS-10

A major revision of the OSICS-8 (Table 3) was therefore postulated with the intention of ensuring that all specific as well as site or pathology nonspecific diagnoses could be classified. Because the OSICS was designed as a 3-character code (for simplicity), it was recognized that simply expanding the OSICS-8 further was impractical because there were not enough letters or digits remaining to cover all desired options. The subsequently designed system was labeled as the OSICS-10 (Table 4), which is now a 4-character coding system that can be further refined to OSICS-11, etc. As in the OSICS-8, the first letter in the OSICS-10 represents the anatomical site, and the second letter represents pathology (Table 1). The OSICS-10 has 2 characters (rather than 1 of OSICS-8) to further describe the pathology. The succinctness of the OSICS-8 has been replaced in the OSICS-10 by a more

TABLE 3. OSICS-10 Sample Codes (From Knee Region)

Pathology Specific Detail	Code	OSICS-8 Codes
Knee sprains/Ligament injuries	KJXX	
Acute ACL injury	KJAX	KL1
Partial ACL tear	KJAP	KLI
ACL rupture (isolated)	KJAR	KL1
ACL strain/rupture with chondral/meniscal injury	KJAC	KL1
ACL graft rupture	KJAG	KL1
Acute PCL injury	KJCX	KL2
Partial PCL tear	KJCP	KL2
PCL rupture	KJCR	KL2
PCL strain/rupture with associated chondral/meniscal injury	KJCC	KL2
MCL injury knee	KJMX	KL3
Grade 1 MCL tear knee	KJMA	KL3
Grade 2 MCL tear knee	KJMB	KL3
MCL rupture knee	KJMR	KLM
MCL strain/rupture with chondral/meniscal damage knee	KJMC	KC8
Complication post MCL strain/rupture incl Pellegrini Steida lesion	KJMQ	KLP
Posterolateral corner and LCL ligament injuries knee	KJLX	KL5
LCL strain/rupture	KJLL	KL4
Posterolateral corner strain/rupture	KJLP	KL5
PLC injury with chondral/meniscal injury	KJLC	KL5
Patellar subluxation	KJPX	KU2
Combined ligament injuries knee	KJBX	KL1
Combined ligament injury with chondral/meniscal injury	KJBC	KL1
Superior tib fib joint sprain	KJSX	QJ1

TABLE 4. Football Injury Categories

Body Area	Injury Category	Example Specific Diagnoses
Head/neck	Concussion	Concussion, concussive migraine
	Facial fractures	Fractured nose, fractured mandible
	Neck sprains	Whiplash, cervical disc prolapse
	Other head and neck injuries	Facial laceration, eye injury
Shoulder/arm/elbow	Shoulder sprains and dislocations	Shoulder subluxation, dislocation
	A/C joint injuries	A/C joint disruption
	Fractured clavicles	Clavicle fracture
	Elbow sprains or joint injuries	Elbow ligament sprain, loose body
	Other shoulder/arm/elbow injuries	Ruptured biceps tendon
Forearm/wrist/hand	Forearm/wrist/hand fractures	Scaphoid fracture, metacarpal fracture, radius fracture
	Other forearm/wrist/hand injuries	Ruptured flexor tendon, dislocated finger
Trunk/back	Rib and chest wall injuries	Fractured rib, costochondral injury
	Lumbar and thoracic spine injuries	Lumbar sprain, disc prolapse
	Other trunk/back/buttock injuries	Kidney, spleen trauma
Hip/groin/thigh	Groin strains and osteitis pubis	Adductor muscle strain
	Hamstring strains	Hamstring strain, tendinopathy
	Quadriceps strains	Rectus femoris strain
	Thigh and hip hematomas	Thigh hematoma
	Other groin/hip/thigh injuries	Hip labral tear
Knee	Knee ACL	Knee ACL (+/− other pathology)
	Knee MCL	Isolated knee MCL
	Knee PCL	Knee PCL
	Knee cartilage	Meniscal tear, chondral lesion
	Patella injuries	Dislocated patella, PFJ pain
	Knee and patella tendon injuries	Patellar tendinopathy, popliteus tendinopathy
	Other knee injuries	Tib-fib joint disruption, knee hematoma
Shin/ankle/foot	Ankle sprains or joint injuries	Ankle sprain, syndesmosis sprain
	Calf strains	Gastrocnemius strain, soleus strain
	Achilles tendon injuries	Achilles tendon rupture, tendinopathy
	Leg and foot fractures	Fractured tibia, fractured fibula
	Leg and foot stress fractures	Stress fracture metatarsal, navicular
	Other leg/foot/ankle injuries	Plantar fasciitis
Medical illness	Medical illnesses	Heat stress, gastroenteritis, asthma

expansive list of classifications. Improved organization of the classification system allows faster and easier navigation through the classifications, aiming to maintain its user friendly status.

Naming the new system, the OSICS-10 allows for minor revisions to be made to the OSICS-8 to form OSICS-9 for those still preferring to use the 3-code system. There are still some potential benefits to using a 3-character system with its smaller number of classifications, hence OSICS-8 is not obsolete at this stage. It is anticipated, however, that all future injury surveillance systems will eventually become fully computerized and the advantage of a more comprehensive system will clearly outweigh the advantage of a more succinct printed list.

Structural areas that were clarified in the formation of the OSICS-10 were:

1. Characters: the exclusion of digits from codes, allowing only letters (it was noted in the previous study that use of a 1 and I could be confusing to coders, causing inaccuracy).
2. Body locations (tier 1): in keeping with previous versions, the OSICS-10 is still primarily based on anatomical location and then pathology; however, the body has been more clearly divided into distinct anatomical regions (Table 1).
3. Pathology (tier 2): order and subsections were made routine between all anatomical chapters (Table 1).
4. Tiers 3 and 4: further describe the pathology classified in tier 2.

The OSICS-10 has also added and/or expanded:

1. Inclusion and exclusion criteria where appropriate, so there is no ambiguity where something should be coded.
2. Not-otherwise-mentioned codes.
3. Location-not-specified codes.
4. Individual codes found to be inadequately covered previously.
5. A post surgical section.
6. A pediatric section.
7. A disabled athlete section.
8. The medical codes section.

Finally, terminology was updated where required to reflect current clinical practice and understanding of the pathogenesis of injuries (for example, references to tendinitis have become tendinopathy).

ADVANTAGES OF THE NEW SYSTEM

The 2 general but diverging contexts for a classification system are (1) accurately classifying but then collapsing diagnoses into specific injury categories for presentation in an injury survey report and (2) creating a database from which a case series of a particular injury diagnosis can be extracted for further study.

The new OSICS-10 now allows diagnoses to be specifically classified (for more detailed use in injury retrieval work) but at the same time allows diagnoses to be easily grouped via their more general tier 2 or 3 parent classifications to allow a more generalized analysis of injury patterns. As the OSICS is the primary coding system for the injury surveillance systems of the Australian Football League (AFL)[17] and Cricket Australia (CA),[18] specific injury categories have already been developed for use in these sports to allow accurate comparison of injury data between different studies. The mapping of the OSICS classifications back to major injury categories for use in research publications is shown for the AFL (Table 4) and cricket.[13,14] The differences between these 2 sports reflect the different preferred categories; for example, knee ligament injuries are relatively rare in cricket, so a single category for these injuries is sufficient; whereas in Australian football, ACL, PCL, and MCL injuries are all common enough to warrant distinction. Other sports can likewise develop slightly different categories that best reflect their individual injury profiles; soccer may use a similar classification to Table 4 but include a specific category for tibial haematomas; tennis may be similar to the cricket classifications[13,14] but would need a specific category for epicondylosis; baseball requires a parent category for elbow instability, etc.

With injury surveillance, diagnostic detail may be less important. In an injury surveillance report, all hamstring injuries would likely be reported in a general table as hamstring strains; therefore, it is most important that all diagnoses can be retrieved via the same parent category. For injury surveillance systems that still involve recorders using paper printouts (as opposed to computerized systems) the smaller number of codes in the OSICS-8 may have an advantage.

With the alternative situation of coding for later retrieval of information, however, diagnostic detail is much more important. For example, if it was decided to follow-up severe (grade 3) hamstring muscle and tendon injuries and compare those that were managed surgically to those that were managed conservatively, it would be very useful for the more severe (grade 3) injury to have a different classification than the more numerous grade 1 and 2 injuries, enabling the user to easily access only the injuries needed from the database.

The OSICS-8 also needed updating with regard to its management of nonspecific diagnoses, primarily occurring in either the situation of delayed or secondary classification (where the original diagnosis was not clear or incomplete when it came to be classified, or where the diagnosis was provided by a less experienced clinician, resulting in less diagnostic detail (eg, knee ligament injury as opposed to an ACL rupture and lateral meniscal tear). The inclusion of broad parent classifications (tiers 1, 2, and 3) and location-not-specified classifications should hopefully have addressed this problem. Where possible, the OSICS-10 has been mapped back to the OSICS-8 to provide a limited ability to transfer between the 2 systems, with limited translation over to ICD-10 also provided for translation of injury codes between systems.

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