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OLYMPIC GAMES - BARCELONA 1992

MEDICAL REPORT AND RECOMMENDATIONS

Clive Noble

INTRODUCTION

I was appointed to be Team Doctor by the President of NOCSA, Mr Sam Ramsamy on 24 June 1992, 26 days before departure to the Olympic Games.

Recommendations

The Chief Team Doctor should be appointed at the end of the previous Olympic Games. It would be preferable for this doctor to have attended the previous Olympic Games as he would have a better understanding of the structure and requirements of the Olympic medical team.

The doctor should also become a member of the International Olympic Medical Officers and attend their meetings.

He/She should aim for closer liaison with the African Group of Olympic Medical Officers.

He/She should become a member of the Doping Control Committee of NOCSA and attend International meetings to increase knowledge.

The Chief Team Doctor should help in the selection of the rest of the medical team.

I was the only doctor appointed and no physiotherapist or masseurs were to accompany the team.

The IOC is apparently going to prescribe minimal standards on the size of the medical team.

In consultation with the Canadian Medical Team they advised that it was better to take physiotherapists who can do massage rather than pure masseurs.

The President had arranged for the Australian physiotherapists to help with any injuries which may occur; they were adjacent to the SA team in the Olympic Village.

If the team is large enough, team doctors and physios should accompany the larger teams, e.g. soccer and athletics to their training and competition venues. A doctor/physiotherapist should accompany any team which lives away from the Olympic Village. If possible, a doctor should accompany the team for the more violent sports - boxing and wrestling.

The reason for this small medical team was due to the fact that the late entrance of the team to the Games had restricted the number of persons involved in the Olympic Village and the President had, in my opinion, correctly decided to send more competitors than officials.

The team consisted of approximately 96 athletes and 24 officials. There were also 25 disadvantaged black sportsmen and officials who had FX accreditation and lived ± 100 km from Barcelona. They had the use of the Olympic Village but could not sleep in the Village. There were approximately 25% black and coloured competitors in the team.

In order to increase the size and quality of

the team, a massive restructuring programme of sport in South Africa is needed.

It is important to increase the number of disadvantaged sportsmen in the team. To do this it is essential initially to work at the strengths of these athletes. Therefore, sports such as athletics, soccer and boxing should be given priority.

Adequate facilities are essential, e.g. Olympic tracks, gymnasiums and soccer fields in all major black areas. Coaches should be imported with the aim of teaching our coaches but also helping to polish our distinguished athletes. More use of sports science is essential.

I was invited to participate in an investigative panel to assess the factors in Cheryl Roberts' stimulant drug taking case. Two major factors emerged: (a) the test was incorrectly done in that the question regarding the taking of medication had not been asked and (b) the form was incorrectly planned.

An Anti-Doping Committee should be responsible for educating both athletes and officials. It should also be responsible for a programme of random and routine testing to be carried out on all top athletes.

The forms and methods of testing should be standardised and be brought up to international standards.

PRE-GAME ASSESSMENT

One week before departure, the team assembled at the Jan Smuts Sun Hotel. Here they were tested for Banned Substances. Although the respective sports organisations were informed in May by means of an IOC circular concerning banned substances, a number of the Olympic competitors had taken banned substances.

All athletes should be tested for drugs before departure as was done. They should be knowledgable as regards doping beforehand.

The team was advised that in Barcelona they were not to drink tap water, even to clean their teeth with tap water, because of the danger of infection. They were also forbidden from swimming in the sea because of pollution and the danger of gastro-intestinal infection.

A full investigation must be done into the site of the next Olympics, i.e. Atlanta, as regards temperature, humidity, altitude and any other factors that could affect the athletes. This should be done as soon as possible so that training programmes can be modified to improve performance, e.g. the marathon runners trained in the wrong conditions for Barcelona. A large part of their training should have been done in Barcelona or if this was not possible running on a treadmill in correctly heated rooms with high humidity to improve acclimatisation.

The athletes were apparently tested prior to this at the University of Pretoria. These tests were for physical fitness.

Sports Scientists should play a fundamental role in preparing the team for Olympic competition. Careful monitoring of the team is essential. Coaches should be taught more about the scientific assessment of fitness and should liaise closely with Sports Scientists.

The team left on 20 July on a direct night flight from Johannesburg. The team travelled in Economy Class.

Day time flgiths if possible would be helpful to the athletes. An extra period of time should be made available for "jet lag".

For long flights, e.g. Atlanta, I would recommend the use of "sleeping pills" for those who request them if there is a night flight.

The team arrived 5½ days before the opening ceremony.

A period of acclimatisation and adaptation, as was done in Barcelona, is recommended.

OLYMPICAL VILLAGE

In the Olympic Village, there was an abundance of food and water obtainable 24 hours a day.

Soft drinks were also readily available.

Weight control, e.g. daily weighing is recommended with suitable dietary restrictions in cases of weight alteration.

A thorough knowledge of diet control and correct eating by a dietician is fundamental to all coaches. This should be done through the individual unions but should be monitored by NOCSA to assess that all sports associations comply.

Until competitions began, training continued at venues in and around Barcelona.

If at all possible team and individual coaches should be given adequate accreditation in order to allow them to accompany the participants to all venues and to the Olympic Village. These coaches should have (a) knowledge of dietetics and (b) knowledge of massage.

One of the teams rowing was not living in the Olympic Village and had no organised medical cover.

Teams not living in the Village should have their own medical team with them.

Barcelona in July/August has a high temperature and high humidity.

A full investigation must be done into the site of the next Olympics, as discussed previously.

MEDICAL

A number of athletes arrived at the Olympical Village with upper respiratory tract infections. Even on the plane, 3 competitors had to be treated for 'flu and two for nausea and vomitting.

The basic medical requirements of a team of a similar size should be a minimum of 3 doctors:

- *a sports medicine specialist;*
- *two general practitioners with sports medicine background;*
- *three physiotherapists who would also do massage.*

Sixty two cases were treated in the 3 weeks I was with the team - 32 with injuries and 30 with illness. Seven cases were from the disadvantaged team and 6 cases were officials.

Adequate medication to cover all major and minor medical problems is necessary. Equipment to handle medical emergencies, e.g. heart attacks, should also be available.

Only one case of illness (Ludwig's Angina) from one of the disadvantaged group required admission to hospital.

The doctors must immediately assess the medical facilities available at the Olympic Village and sports venues.

Nine cases were referred to the Australians for physiotherapy.

Unfortunately massage was not available from the Australians as their masseurs were already overburdened with work. I therefore took over the role of masseur and did 11 cases. The athletics teams brought in an American Chiropractor who did approximately 8 cases, most of them from the Athletics team. The massage was not for medical treatment, but for the feeling of general well-being that it gives.

The swimming coach also gave massage to the swimmers.

See recommendations for the basic medical requirements of a team of a similar size, as discussed previously.

MEDICAL COMMITTEES

I attended:

- The general meeting of team doctors at the Olympic Village. This consisted of an instructional talk covering all aspects of medical treatment and drug testing at the Olympic Games.

It is important that all medical personnel attend all medical meetings at the time of the Olympic Games. This helps to keep abreast

of the latest developments.

- An instructional tour of the Polyclinic in the Village as regards all its facilities.

  Polyclinic and drug testing tours are essential.

- A tour of the drug testing facility in Barcelona.

- A meeting of the International Olympic Medical Officers Association, under the Secretary-Generalship of Mike Iraqui of the United Kingdom. I was granted membership to this organisation whose aim is to increase knowledge of Olympic Sports Medicine.

  Membership of the IOMOA is important.

- A meeting of the African Olympic team doctors under the Chairmanship of Prof. Constant Roux from the Ivory Coast.

- A number of meetings with the Australian and Canadian Medical Groups concerning the size and structure of future medical teams from South Africa.

  Closer liaison with the African Medical Group is essential in order to increase contact with our African colleagues.

Dr Clive Noble,
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DIAGNOSIS AND TREATMENT OF LONG HEAD OF BICEPS TENDINITIS IN SPORTSMEN

A Goldberg and CA Smith

Key words: *Soft tissue injury, long head of biceps tendinitis, deep transverse frictions, rehabilitation programme.*

ABSTRACT

Soft tissue injuries of the shoulder joint in sportsmen are common. A condition that seems to be infrequently diagnosed by medical practitioners (yet well recognised by physiotherapists) is that of long head of biceps tendinitis. The signs and symptoms for this extremely common condition are presented. Treatment is by deep transverse frictions (DTF) and response to treatment is uniformly good.

INTRODUCTION

Soft tissue injuries of the shoulder joint are common among both the sporting and non-sporting public. Such injuries in sportsmen are usually due to an overuse nature as in "throwers shoulder" or "swimmers shoulder" but may also be due to sudden exertional force as in weight-lifting.

The main soft tissue injuries of the shoulder affecting the sportsman are collectively grouped and generally known as the "rotator cuff impingement syndrome". This refers to a number of clinical entities, the most common of which is supraspinatus tendinitis, but also includes infraspinatus and subscapularis tendinitis. The well known "painful arc" sign is normally present (pain is experienced between 70 and 120 degrees when the arm is actively abducted[1]) and the impingement sign may also be positive (passive flexion of the arm to 90 degrees and then medial rotation of the shoulder produces the symptoms). Continued impingement may lead to degeneration of the rotator cuff tendons and possible rupture of the cuff.

However, injury to the shoulder is not only confined to the above structures but also commonly involves the long head of biceps tendon. This structure is a common source of shoulder pain in sportsmen, yet is often overlooked by clinicians. The reason for this is that the signs and symptoms associated with this lesion often match those of rotator cuff injuries, and it has thus become fashionable to lump such injuries under this diagnosis.

This brief paper thus discusses the clinical condition of long head of biceps tendinitis with the intent of bringing it to

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the attention of diagnostic clinicians.

ANATOMY

The long head of biceps tendon attaches superiorly to the supraglenoid tubercle of the scapula and lies within the cupsule of the shoulder joint. It glides over the head of the humerus and leaves the joint in the bicipital groove which is bordered by the greater and lesser tuberosities at the proximal end of the humerus. Above the humeral head, the coraco-acromial ligament forms an arch over the shoulder joint to joining the coracoid and acromion processes to each other. Underneath the acromion lies the sub-acromial bursa which lies over the supraspinatus tendon and the intra-articular portion of the long head of biceps tendon. With abduction, elevation and external rotation of the arm, impingement of these structures may occur.

SIGNS AND SYMPTOMS

Long head of biceps tendinitis is known to occur in baseball pitchers, canoeists, swimmers, weight-lifters, javelin-throwers, golfers, volleyball and tennis players and is thus recognised as the most common cause of anterior shoulder pain.[2] Even so, this condition is seldom diagnosed by medical practitioners when referring these patients for physiotherapy. The traditional diagnoses include impingement syndrome, painful arc syndrome and rotator cuff tendinitis which are uninformative and non-specific regarding the injured structure.

The reason for infrequent diagnoses of this condition is unclear as it is well recognised by physiotherapists. The condition may occur on its own or simultaneously with a supraspinatus lesion, and thus presents with signs of a painful arc and impingement syndrome.

Biceps tendinitis may either present in the acute or chronic form. The acute patient normally complains of pain in the shoulder caused by a specific action, such as baseball pitching or spiking in volleyball, and may also have associated weakness when attempting to play. The patient with the chronic form may have the symptoms for some months, only seeking treatment when his pain becomes severe enough to limit his playing. The injury is often worse in the beginning of the season becoming easier as the season progresses yet still remaining a chronic, nagging ache whenever the patient plays.

Several tests are available to the clinician to confirm the diagnosis. The most common ones are as follows:

1 Yergason's test
The affected arm is held with the elbow flexed at 90 degrees and against the chest. The patient is then told to rotate the arm outwards, bend the elbow and supinate the forearm while the examiner resists these movements at the elbow and forearm. Downward traction must also be applied to the elbow. The examiner palpates the biceps tendon in the bicipital groove in order to detect subluxation of the tendon. Pain is reproduced by either subluxation of the tendon or due to the tendinitis injury itself. It must be stressed that Yergason's test is primarily used to detect instability of the tendon in the bicipital groove.[1]

2 Impingement sign
The well documented impingement sign may be present if either the supraspinatus or biceps tendons are being pinched under the coraco-acromial arch during active flexion. Pain localised to the area of the coraco-acromial arch is indicative of impingement.[1] In order to differentiate the two, the patient with biceps tendinitis will demonstrate tenderness over the bicipital groove with palpation.

3 Resisted test
Resisting elbow flexion may produce pain, but in order to clarify the affected structure, pain with resisted supination of the pronated forearm with the elbow flexed to 90 degrees would positively indicate biceps tendinitis.

4 Crepitus may be felt if there is tenosynovitis of the tendon in the groove.

If the above tests are negative, one should not rule out the diagnosis. In chronic cases, palpation may be the only positive sign which can be elicited. Tenderness should be sought along the length of the tendon

from the bicipital groove to the proximal portion of the muscle. The mid-part of the tendon is usually at fault.[3]

TREATMENT

Treatment of biceps tendinitis is by way of DTF of twenty minutes duration on alternative days[3] or 5 to 10 minutes duration on consecutive days. The bicipital groove is easily palpated with the arm in some degree of external rotation.[4] This is also the position recommended for performing DTF. The DTF act by breaking down the adhesions within the tendon and its sheath similarly as it does for muscle injuries.[5] Other physiotherapeutic modalities which can be used include ultrasound and laser therapy. Steroid infiltration is not required as full recovery is to be expected if the correct site(s) is treated effectively with frictions. Usually three to four sessions suffice although chronic cases may require up to eight treatments until complete recovery is achieved.

A rehabilitation programme involving stretching and strengthening must also be incorporated once the acute phase is over. Stretching the tendon must be done before and after exercise with the arm in 90 degrees of shoulder abduction and external rotation, with the forearm pronated and the elbow extended. The shoulder is then extended and slightly more or less abduction can be applied to get the best stretch. The patient can also be taught to stretch the tendon by holding the arm out in this position but having the hand and wrist supported against a wall or door frame. The body is then used to apply further stretch to the tendon. The double handed method with the uninjured arm used to help stretch the tendon in extension behind the back is also useful. The patient must then be given resisted exercises to strengthen the muscle and tendon, especially in the position which stresses the tendon most, i.e. full shoulder elevation for volleyball players and abduction, external rotation and extension for baseball pitchers. These activities need to be slowly retrained in order to completely rehabilitate the patient.

CONCLUSION

Tendinitis of the long head of biceps is a common cause of shoulder pain yet is infrequently diagnosed by referring medical practitioners. The signs of pathology are a positive Yergason's test while a positive impingement sign with tenderness localised over the bicipital groove provide extra confirmation of the diagnosis. Treatment is normally by way of DTF applied to the affected area. Recovery is good in most, if not all cases.

CASE REPORT

A young male, aged 23 years and a keen sportsman, reported for treatment for his right shoulder which he injured while playing baseball. A recurring injury which had troubled him at the beginning of the previous two seasons, it hurt him most when he pitched the ball. When he presented for treatment, the pain had been present for two weeks and had progressed to the point where he could no longer pitch the ball without severe shoulder pain. He had recently begun a weights programme and felt that this could also have contributed towards the injury.

On examination of his shoulder, he had full range of active and passive movements, the pain only being elicited at the end of range of lateral rotation and elevation through abduction. He experienced diffuse release pain in the shoulder when resisting abduction in the neutral position. All other resisted tests were pain free. Palpation of the should did not produce a specific site of pain although there was some tenderness in the region of the long head of biceps tendon. The differential diagnoses considered were sub-acromial bursitis and biceps tendinitis.

He was initially treated for the bursitis for two sessions with laser, ultrasound, interferential and mobilisation therapy, which had little lasting effect as he still had pain when pitching the ball. Reassessing the shoulder, it was decided to treat the biceps tendon as this reproduced the pain most clearly with palpation and had since become painful when resisting elbow flexion. The treatment was thus changed to DTF of the tendon in the bicipital groove with ultrasound and laser therapy. Following a further two sessions he could pitch painfree and was summarily discharged from treatment.

References on request.

HOCKEY INJURIES IN HIGH SCHOOL FIRST TEAM SCHOOLGIRL PLAYERS OF THE SOUTHERN TRANSVAAL AND GRIQUALAND WEST

M Petrick, KF Laubscher, EM Peters

Key words: *Running head, hockey injury in high school first team players.*

Abstract

Questionnaires were sent to the first team players and coaches of the seven best hockey schools in the Griqualand West and Southern Transvaal regions during the 1990 South African Schools hockey season. Fifty percent of the players (n = 157) had sustained injuries as a result of hockey during their hockey careers. The most prevalent injuries were ankle injuries (27%), knee injuries (15%) and lower leg overuse injuries (8,5%).

Of all the injuries sustained during their hockey careers, in Southern Transvaal knee injuries were the most common (19,6%), followed by ankle injuries (17,9%) and injuries to the face and head (8,9%). Ankle injuries were the most common in Griqualand West (33,3%), followed by overuse injuries of the lower leg (12%) and knee (10,7%) and thigh muscle (8%) injuries.

Although the coaches were well-trained and took precautions attempting to prevent the development of overuse injuries in their players, a discrepancy existed between the injuries reported by the coaches and players. The coaches report a much lower incidence of injuries amongst their players in the 1990 season than the players do.

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INTRODUCTION

In a study reported by Van Heerden (1991)[1] an injury rate of 4,8% was found amongst primary school girl hockey players during a two week hockey competition. Four of the five recorded injuries occurred due to high velocity impact, while one player sustained a calf muscle tear. However, little is available on common hockey injuries amongst adolescent and adult hockey players. In a preliminary study undertaken by Klemp and Jordaan (1989)[2] it was found that shin splints was highly prevalent among a select group of high school hockey players. This prompted the authors to undertake a broader survey of the incidence of hockey injuries amongst female hockey players in South Africa.

The objective of this study therefore was to obtain a preliminary profile of injuries which are prevalent in first team female hockey players at high school hockey level in the Southern Transvaal and Griqualand West regions.

Table 1: Players' problems with feet, knees, back, legs and hips

PROBLEM AREA	DESCRIPTION	INCIDENCE n*	%
Feet	Flat feet	11	7
	Painful feet, foot cramps, plantar fasciitis, callouses, blisters	13	9
Total		**24**	**16**
Knees	Painful knee	13	9
	Weak knee	3	2
	Other	5	3
Total		**21**	**14**
Back	Low back pain	9	6
	Torn back muscles/back injury	3	2
	Other	6	4
Total		**18**	**12**
Legs	Shin splints/compartment syndrome	5	3
	Weak/injured ankles	3	2
	Tight hamstrings	16	10
	Muscle soreness after playing	5	3
Total		**29**	**18**
Hip	Painful/clicking hip	2	1
Total		**2**	**1**

* n = number of players

METHOD

Questionnaires were sent to the first team hockey players of the top seven schools of both Griqualand West and Southern Transvaal Schools' Hockey League (n = 157). The questionnaires sought information on aspects such as a history of orthopaedic problems, involvement in other sports, hockey training (including training methods, playing surfaces, shoe wear) and a hockey injury profile.

The coaches of each of the teams (n = 12) also received a questionnaire requesting details regarding their coaching techniques or programmes and were asked to keep an attendance register of their players for both practices and matches. They were also asked to record any hockey injuries their players sustained during the 1990 hockey season. All questionnaires were completed during August and September 1990.

Statistical analysis

For discrete variables, groups were compared using the chi-square test to analyse contingency tables where the samples sizes and expected frequencies were adequate. Where sample sizes and expected frequencies were too small, Fisher's exact test was employed in the case of 2 x 2 tables.

For continuous variables, groups were compared using either Student's t-test, taking into account whether the variances of the groups were equal or not. Where appropriate, the Mann-Whitney test was used. In all cases, the level of confidence was set at 0,05.

RESULTS

Players

Seventy five Southern Transvaal and 81 Griqualand West first team hockey players completed the players' questionnaire. The mean age was 16 (± 1,06) years. These players were healthy, active individuals, most of whom (93%) participated in other sports apart from hockey. Their level of hockey participation was high, with 45% playing at a provincial level and 40% playing club hockey. The players had been members of the first school hockey team for a mean duration of 1,8 (± 1,08) years.

Details of problems the players experienced with their feet, knees, backs, legs and hips are given in Table 1. From this it is apparent that tight hamstrings, painful knees and feet were the most commonly found ailments.

The players participated in a total of 22 different types of sport apart from hockey. Of the summer sports, swimming was the most popular (27%). Tennis was the next popular (16,6%), followed by jogging (10,6%), squash (10,6%) and athletics (10,6%). Of the winter sports, jogging was the most popular (18%), followed by tennis (15,5%) and squash (12,9%).

The majority of players

Table 2: Activities included in a hockey practice

Activity	% Players	Duration (minutes)
Sprinting	82	5
Jogging	92	10
A combination of sprinting and jogging	97	15
Stickwork	97	20
Dribbling	96	15
Stretching	97	before training 10 after training 5
Other activities mentioned by players		
Hockey techniques	29	15
Practice matches	27	15
Game tactics	21	15
Goal shooting	15	10

Table 3: Club and indoor participation in the Southern Transvaal (n = 75) and Griqualand West (n = 82)

% Playing club hockey		% Playing indoor hockey			
		At school		At a club	
ST	SW	ST	GW	ST	GW
47,3	31,7	67,6	46,2	19,7	36

ST = Southern Transvaal
GW = Griqualand West

(62%) played hockey more than three times a week and a typical practice session was considered to be longer than 60 minutes by 73% of the sample while 82% of the players considered a typical match to be 30 minutes or less each way. Activities included in a hockey practice and the mean time spent on each are listed in Table 2.

All the respondents reported warming up before a hockey match and acknowledged the necessity of a warm up. The pre-season fitness level appeared not to matter greatly to the players, as 11% reported never getting fit before a season, 56% sometimes getting fit and only 33% always getting fit before the hockey season started.

The mean time spent warming up before a match was 20 minutes. This included stretching (36,5% of players mentioning this), followed by hockey techniques involving stickwork (26,6%). Jogging was mentioned by 23,6% of the players, while 11,9% mentioned sprinting or a jog-sprint combination as part of the warm-up.

The shoes most frequently worn for playing hockey were hockey boots (85%). Other shoes worn included "tackies" (6%), jogging shoes (12%) and shoes with arch supports (11%). Seventy three percent of the players wore the same shoes for practices and matches. Twenty percent wore "tackies" for the practices and hockey boots for matches. Hockey was most frequently played on grass (97%). Other surfaces sometimes played on included synthetic surfaces and soil.

Fifty percent of the players had sustained injuries as a result of hockey during their hockey careers. The total number of injuries recorded was 130, 75 (58%) of which occurred in the 1990 hockey season. The most frequent injury was an ankle injury (27%), followed by 15% of knee injuries and 8,5% of lower leg pain. Facial injuries were reported by 7,6% and quadriceps injuries by 7%. Other injuries mentioned included back injuries (5%), thumb and finger injuries (4%), whilst shoulder and foot injuries each totalled 3%.

When comparing Southern Transvaal and Griqualand West first team hockey players, it was evident that significantly more first team Southern Transvaal school hockey players played club hockey than Griqualand West players ($p = 0,048$) (Table 3). Further, more Southern Transvaal than Griqualand West players played indoor hockey at school ($p = 0,008$), whereas more Griqualand West players played indoor hockey at a club ($p = 0,028$). Both groups of players started training before the start of the season.

The differences in time spent on activities during a hockey practice are given in Table 4. Before a hockey match, Griqualand West warm up for longer (25 min) than Southern Transvaal (20 min) ($p = 0,027$). No significant difference was found in the activities of the

Continued on pg 14

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Table 4: Differences in time spent on activities during a hockey practice

Activity	Southern Transvaal	Griqualand West	p-value
Dribbling	20 min. *	10 min.	0,000
Stretching (before training)	mean time = 5-10 min. distribution = 0 - >15 min.	mean time = 5-10 min. distribution = 0 - 15 min	0,013
Stretching (after training)	< 5 min.	> 5 min.	0,023

* min. = minutes

Table 5: Differences in injury patterns between Southern Transvaal and Griqualand West

Injury	Southern Transvaal		Griqualand West	
	Incidence		Incidence	
	n*	%	n*	%
Knee injuries	11	19,6	8	10,7
Ankle injuries	10	17,9	25	33,3
Injuries to face and head	5	8,9	5	6,7
Thigh muscle injury	3	5,4	6	8
Lower leg overuse injuries	2	3,6	9	12
Other injuries **	25	44,6	53	29,3

* n = number of players

** The category "other injuries" comprises 21 additional types of injuries, each having been sustained by a small number of players.

players included in their warm up.

A significant difference (p = 0,005) was found in the type of shoes worn for hockey. Jogging shoes were worn by 4% of the Southern Transvaal players, while 19% of the Griqualand West players wore them. Significantly more Southern Transvaal players (95%) wore hockey boots when compared to Griqualand West players (75%) (p = 0,001). Southern Transvaal players appeared to have played hockey on synthetic surfaces more frequently than Griqualand West players. Forty percent of Southern Transvaal players and only 25% of Griqualand West played on synthetic surfaces (p = 0,044).

The Griqualand West players played more frequently on soil than Southern Transvaal. Only 13% of the Southern Transvaal players played on soil, while 50% of the Griqualand West players played on soil (p = 0,000).

However, when players were asked to list all injuries ever sustained during previous hockey seasons, including 1990, no significant differences were found in the number of injuries per injured player. There was a difference in the injury pattern between Southern Transvaal and Griqualand West (Table 5). Both groups of hockey players recorded the highest amount of injuries for the first 6 months of that current year (1990), followed by 1989 and the second half of the year 1990 up to the date of completion of the questionnaire. No significant difference was found between Southern Transvaal and Griqualand West in the incidence of lower leg overuse injuries in the 1990 hockey season (25,33% of Southern Transvaal vs. 29,27% of Griqualand West players).

Coaches

Twelve choaches, two of which were male and equally representing the Southern Transvaal and Griqualand West, completed the questionnaire. Eighty three percent of the coaches had completed hockey instructors' courses and examinations, with 55% of the coaches having had more than 10 years of coaching experience and 83% having played at provincial or international level.

All coaches reported including pre-season training in the hockey training programme of their players. In all cases this pre-season programme included stickwork and stretching, while most (75%, n = 9) included combinations of sprinting and jogging.

The mean frequency of reported pre-season training was twice a week, increasing to twice or three times a week during the season. Pre-season practice sessions mostly lasted between 45-60 minutes while sessions increased to 60-90 minutes during the season.

The main differences in the

programmes before and during the season were that endurance training was allocated 10-15 minutes pre-season while only given 10 minutes in season. Stickword received more attention in the season (20 minutes per session) than in the pre-season period (15-20 minutes a session). All coaches emphasised a stretching programme and taught their players to stretch before training and matches. The coaches, however, maintained that most players did not stretch after training or matches.

The coaches expressed the opinion that it was necessary for the players to wear hockey boots and reported that both practices and matches were generally played on grass surfaces.

According to the reports of the coaches, 30 injuries were sustained as a result of which a total of 67 practices and 22 matches were missed during the 1990 hockey season. The most frequent injuries reported by the coaches in the 1990 season were lower leg overuse injuries (13 players = 43%), followed by the knee (6 players = 20%) and ankle injuries (5 players = 17%). Two players had lower back problems while one player each had a wrist, hip, nose or thumb injury. Hockey practices were mostly missed due to knee injuries, followed by lower leg overuse injuries and ankle injuries. Matches were mostly missed due to knee injuries and lower leg overuse injuries.

Only 54% of the coaches (n = 12) emphasised strapping after injury, while 64% were in favour of physiotherapy. Most did not emphasise strength training and proprioceptive exercises. Other post injury rehabilitation measures mentioned by the coaches were cool-down stretches after practices or matches, rest, and rubbing in some ointment.

DISCUSSION

The most significant finding of this study was that half of the players had sustained injuries as a result of hockey ever since they had started playing the sport. This can be considered a high injury rate and the need for education on hockey injuries is self-evident.

A further important finding of this study was that ankle, knee and lower leg overuse injuries were the most commonly reported by the players (n = 157). This correlates with the most commonly found running injuries which are of the ankle and knee.[3-5] From the findings of this study it would thus appear that education will have to be geared towards these injuries and their aetiology.

Firstly, the high incidence of ankle injuries can be attributed to the sudden stop-start actions and changes of direction needed in hockey which place strain on the ankle ligaments. According to Verow[6] the use of shoes with studs on artificial surfaces increases the instability of the ankle and therefore the risk of ankle injuries. When wearing hockey boots while playing on grass, the foot may move inside the shoe for any twisting movement since the shoe is anchored on the ground.

More ankle injuries occurred amongst the Griqualand West players when compared to the Southern Transvaal players. This could be due to their harder playing surfaces and the greater length of time the Griqualand West players spent on soil. In addition, the fact that the Griqualand West players did not wear hockey boots to the same extent as the Southern Transvaal players could have placed the Griqualand West players at a higher risk of ankle injury. The hockey boot has greater mobility on soil than on an artificial surface or grass, leading to less strain on the ankle. This explains the difference in our findings, when compared to those of Verow.[6]

Secondly, knee ligament injuries may result from a rotatory force on a flexed knee, which can occur due to quick changes of direction or a knock on the flexed knee. Wearing studded shoes, more movement will occur at the knee during quick changes of direction since the shoe cannot move on the playing surface. Sustained positions of knee flexion such as required in hockey, pose much strain on the patello-femoral joint and may give rise to anterior knee pain.

The greater incidence of knee injuries amongst Southern Transvaal players may thus be attributed to the fact that Southern Transvaal players wear hockey boots more frequently.

Thirdly, although direct blows to the shin occur in hockey, doing too much, too soon and too hard all play a role in the incidence of intrinsic or overuse injuries of the lower leg[7] among hockey players. The frequent changes of direction and jarring on the lower leg also increase the risk of overuse injuries.

When recording all injuries sustained during their hockey careers, more Griqualand West than Southern Transvaal players indicated lower leg overuse injuries. The hard ground in the Griqualand West region and the fact that the Griqualand West players play more often on soil than their Southern Transvaal counterparts, may have increased their risk of lower leg overuse injuries.

In addition to these major sets of aetiological factors resulting in injuries of the ankle, knee and lower leg in hockey, Verow[6] associates injuries with playing position. He reports that injuries found in goalkeepers included direct trauma from sticks and the ball, head injury, loss of a testicle, rotator cuff strain (d.t. falling on the outstretched hand), olecranon and trochanteric bursitis from landing on these parts. On the other hand, outfield players were reported having suffered lacerations around the head, muscle injuries and strains to the lower back and upper leg areas due to running or twisting in a stooped position. Further, he points out that synthetic surfaces give rise to more grazes and the use of studs on these surfaces increases the instability of the ankle.

As a whole, the coaches were well qualified and had extensive hockey coaching experience. Coaching methods such as pre-season training of shorter duration than the training in season and the emphasis on pre-season endurance training tend to reduce the risk of overuse injury. However, it is of concern that the coaches mentioned the fact that hockey players do not appreciate the importance of post-match/practice stretching. The introduction of greater emphasis on this aspect of injury prevention is thus advocated in the training of hockey players and their coaches.

The unanimous opinion expressed by the coaches that players should wear special hockey shoes is of interest. This observation is in keeping with the rationale that hockey boots facilitate the quick change of direction and acceleration and deceleration which are common in the game of hockey and thereby reduce the stress on the lower leg muscles with concomitant reduction in muscle injuries of the lower leg, particularly when, as reported, this is primarily being played on grass.

The coaches report a much lower incidence of injuries amongst their players in the 1990 season than the players do (coaches report a total of 30 and players a total of 75 injuries). It therefore appears that coaches are not always aware of the injuries sustained by their players and are therefore not in the position to make the necessary modifications to the training programmes of these players. This may lead to a worsening of existing injuries.

In order to prevent injuries and to aid rapid recovery from injuries, it is essential that there should be good communication between players and coaches. Coaches need to be aware of their players' injuries in order to modify their training programmes or to be able to advise them to seek medical attention.

CONCLUSION

We thus conclude from this preliminary survey of high school hockey players that greater awareness and education of the hockey fraternity in terms of factors predisposing to hockey injury is essential, if the high incidence of injury reported in this study is to be reduced. As has occurred in so many of the more frequently researched sports, awareness of the aetiology of injury is a first step towards taking precautions to prevent the occurrence of intrinsic or overuse injury.

With regard to the discrepancies which existed between the injuries reported by the coaches and players, this can be attributed to the fact that coaches are not always aware of the injuries sustained by their players and therefore not in the position to make the necessary modification to the training programmes of these players. This circumstance increases the risk of injury. Good communication and trust between players and coaches are essential and a deliberate attempt to achieve this, needs to be made.

ACKNOWLEDGEMENTS

The authors are indebted to the following persons for their assistance and would like to express their gratitude to Karen Rosen-Allan, Sandra Jordaan, the Department of Biostatistics of the CSIR, as well as all the participating coaches and players.

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COMRADES MARATHON 1992

Joyce Morton

At the Comrades Marathon up-run this year, 9 Elastoplast stations were manned by 120 physiotherapists under the banner of the Natal Sports Interest Group of the South African Society of Physiotherapy. These helpers consisted of practising Natal physiotherapists, physiotherapy students from the University of Durban-Westville, final year physiotherapy students from Wits University and two physiotherapists from Northern Transvaal. As usual we were sponsored by Smith and Nephew whose employees led by Dave Dunn, worked unstintingly to make the day a success. They supplied all the necessary medical paraphernalia to make the runners life easier and, as in the past, they donated literally miles of strapping.

This year, approximately 45 helpers were on hand to record the injuries of the runners treated at the stations. At my station, most of these helpers were doctors. The data is now being analyzed.

Again, as in the past, neither the physiotherapists nor Smith and Nephew received any acknowledgement. We were ignored by the media and even though we asked that the TV cameras focus on the physiotherapists at work, we were passed over.

At a pre-Smith and Nephew lunch party, where I, on behalf of all the physiotherapists, was thanked for the outstanding work we do, a prominent "running" doctor was overheard telling a novice that at all costs, never stop at a physiotherapy station, but to just keep going and run through her problem!

Working in the Red Cross Tent in Pietermaritzburg, I asked my patient, who had been admitted for other reasons, whether the bandage on his knee had been of any help. He explained to me that he had been doing too much hill work and that he had developed an Iliotibial Band Friction Syndrome. Hoping that it would not be aggravated by the long run, he entered the race but by the time he reached Inchanga, he realized that he could not continue without help. He stopped at an Elasoplast station where he was strapped and given some advice. He told me that without the strapping, he would never have finished. The patient lying in the next stretcher, who was a doctor, proceeded to give my patient a lecture about the fact that an ITB is a friction syndrome and that the physiotherapist's judgement in strapping the knee, was completely incorrect. As the doctor's own judgement was so bad that he had landed up in the tent with excruciating cramps, I thought it was not really the time to argue with him.

Physiotherapists do know the pathology of an ITB and other running problems. We deal with them every day of our working lives. But even in medicine there is a word called "empiricism" and if that strapping helped that runner to achieve his goal, even though the "book" says it was wrong, must we deny him his moment of glory?

Every year we are inundated with thanks from runners who state categorically that they would never heave reached the finish without the help of the physiotherapists. The physiotherapists hear these thanks, but no one else does.

The Natal Technicon Research Department, who is handling our data, will be looking for the runners who stopped at more than one station. Questionnaires will be sent to them asking them whether they did complete the race and whether subjectively, they felt that they were helped by the physiotherapists. Does it matter that much if their answers are subjective?

The Comrades Marathon is a fun race for thousands of runners and even more spectators. On the day, the physiotherapists and their helpers give of their time voluntarily. Smith and Nephew spend literally thousands of rands on the event, as a fight to the physiotherapy profession and to the runners. Surely this is an ideal opportunity to show the public what the medical profession can do for them? Surely this is not the time for our medical colleagues to criticise us, especially without giving us the right to reply?

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With three years design development and sales behind them, the engineering and marketing staff at *Proline Supports* know they have a successful range of products to cover most applications in the limb support and defence market with some exciting additions on the way.

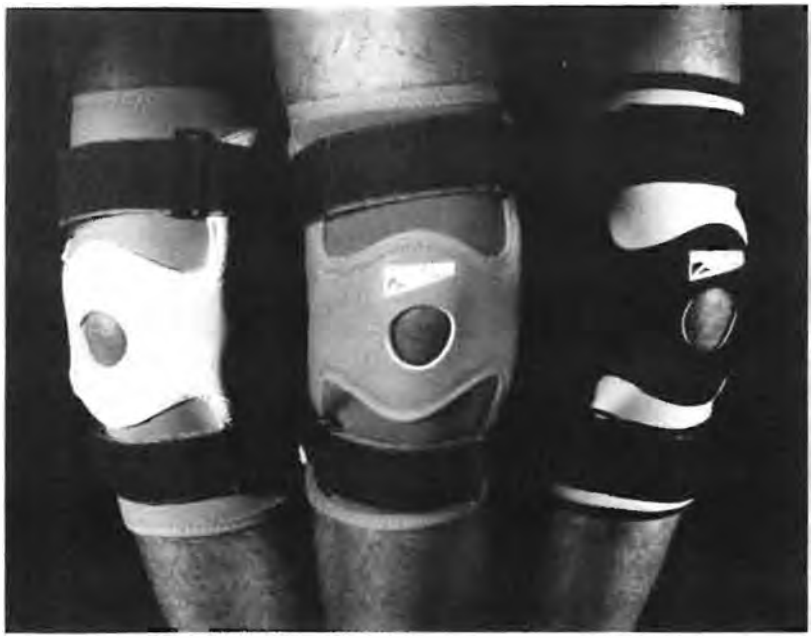
The market at present is split into three distinct categories, *the first* is the basic use of supports as an effective means of defence against injury during rigorous sporting activities. Unfortunately this represents the smallest aspect of the market because sports men and women alike only begin to think about prevention after the damage is done.

Second is the situation where people wear supports to protect the injuries they have received during sport.

Third is the very unfortunate position where supports are worn long after people have stopped competing, but have to wear a support to enable themselves to lead a normal life. Most of these cases are very sad especially when you consider that a lot of the problems could have been avoided if some form of protection had been envisaged. Of course most of the supports have only recently been made available due to the new hi-tech materials necessary for their construction.

The obvious conclusion is that problems in the second and third sector are still likely to exist unless the advantages of supports are fully explained to and accepted by participants of all sports where limb injuries are a possibility.

In very many specialized sports the use of protectors and body armour is an expected and accepted part of the participants atire. Therefore it is not unacceptable for limb supports of all types to be used as an effective means of protection by competitors in a wide variety of sports.



Pinto hinged knee support

So far only sporting problems have been dealt with, but *Proline Supports* are equally suitable for use by sufferers of many conditions associated with limbs and the lower back from damaged tendons and ligaments to some arthritic ailments.

Proline make supports to suit very many different applications and a great deal of consideration is always directed to the area of user comfort. Each model has been designed to do a particular job but also to be worn for long periods.

The supports and their applications

Wrist & Ankle

These supports reduce the warm-up time therefore making the tendons more elastic and less likely to suffer damage. They also improve circulation below the skin also around and into the ankle, wrist knuckle and finger joints thereby reducing the possiblity of cramp as well as providing positive support to overstressed or damaged wrists and ankles. They are ideal for speeding up joint recovery after plaster casts have been removed following tendon or bone damage.

Elbow

Elbow supports do basically the same thing as ankle and wrist, but with more emphasis on muscle support and thermal defence for overstressed tendons that give rise to problems commonly known as "tennis elbow".

Thigh & Calf

The thigh and calf are supports providing direct pressure for muscle assistance and excellent thermal benefits to speed up the natural repair of torn muscle tissue.

Knee

Knee supports are the most

complicated, they are available in two distinct variations: hinged and non-hinged.

Non-hinged are neoprene sleeves with or without straps. Both types offer very good muscular support and stability. The strapped variety offer instantly variable tension to lower thigh and upper calf. The sleeve material on all knee supports provides the same benefits as described for calf and thigh supports.

Hinged knee types are very sophisticated. They provide immense protection and are available in two designs, namely the two strap ("Pinto") or the more robust four strap ("Mustang").

The assistance provided from a hinged support is quite remarkable. Because of its mechanical strength, it provides the knee joint with a big boost to its power to resist the unnatural movement of hyper-extension, twisting and lateral movement thereby affording enormous protection against first time injury as well as defending damaged knee joints from further aggravation.

A point worth noting is that *Proline* hinges are user friendly and in the event of extreme pressure they become sacrificial. They are also hand finished fortified nylon (not steel) and are generally accepted for use in contact sports, because of their patent three piece safety design, at the discretion of the various governing bodies and referees, etc.

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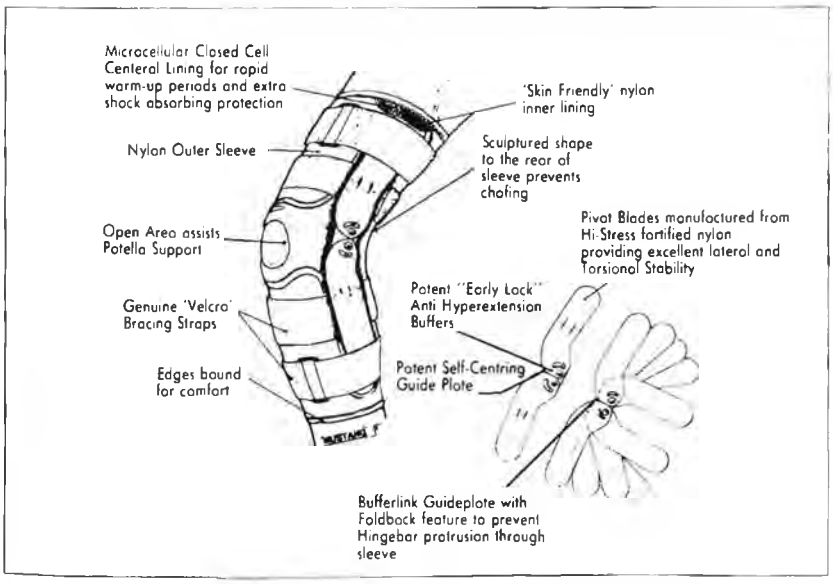

Hinged knee supports: New improved design for greater comfort

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CRICKET INJURIES OF THE SOUTH AFRICAN TEAM AT THE WORLD CUP AND IN THE CARIBBEAN:

THE PHYSIOTHERAPY PERSPECTIVE

Craig Smith

Keywords: Cricket, international tours, injuries, physiotherapy.

ABSTRACT

This paper discusses the injuries which were encountered during the two tours by the South African Cricket Team to the World Cup and the Caribbean Islands. The anatomical site most at risk was the lower limb and the structures most commonly injured were the bones/joints and the muscles. Fielding, batting and bowling all contributed towards injury. Further investigation into this subject should include intrinsic and extrinsic causes, the structures most at risk and injury side dominance.

INTRODUCTION

Recently, the literature has demonstrated a growing interest in the subject of cricket injuries, especially those associated with tours to and from this country.[1,2,3] It is this stimulated interest and approach to the subject that will soon begin to reveal new evidence regarding injuries encountered under these circumstances. The fruits of this work will become evident when the results are translated to the actual play and begin to show on the field in the form of a decrease in the incidence of injury.

The purpose of this paper is thus to report on the injuries which were encountered at the World Cup tournament and during the subsequent tour to the Caribbean where a series of matches were played against the West Indies team.

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THE WORLD CUP

Nineteen squad members made up the South African contingent, being comprised of 14 team players, 2 players to gain experience and help with practices and a coach, physiotherapist and team manager. The squad was away for two months and played a total of 6 warm-up games and 9 World Cup matches. Training sessions were held on non-match

days which incorporated a warm-up routine, batting and bowling in the nets and fielding practice. Warm-up stretching and technique practice was also done on match days.

Injuries and treatment

All 16 players received treatment. There were a total of 56 separate injuries with the most commonly affected area being the thigh. The most common cause of injury was fielding with batting, bowling and genral running also contributing. The muscular structures were affected most, followed by injury to the bones/joints and the tendons. Ligamentous and cartilaginous structures were least affected. One player was treated for 6 injuries, four players for 5 injuries, three players for 4 injuries, two players for 3 injuries and six players for 2 injuries. Only one player was severely injured warranting his exclusion from team selection for a match. An account of some of the commonly experienced injuries and their treatments are briefly discussed.

Head and neck

One player suffered with chronic cervical facet joint syndrome for which he received spinal mobilisation treatment and trigger point acupressure to relieve the associated muscle tension.

Spine and trunk

There were a total of 7 injuries involving the thoracic and lumbar spines, although none serious. Two players suffered injury to their iliolumbar ligaments which responded well to spinal mobilisation treatment. One of the bowlers complained of chronic lumbar stiffness and pain. He had a history of mild Scheurmann's disease with a slight scoliosis and marked quadratus lumborum spasm. Another player developed "rib tip", a stress injury involving the teno-osseus attachment between the stomach muscle and the rib cage. A potentially serious and debilitating injury among fast bowlers, it did not hinder him too much and actually got better as the tour progressed with cross-friction, ultrasound and laser therapy. Finally, one player strained his external oblique abdominal muscle while batting. He was treated with cross-frictions and ultrasound and the area was strapped to assist him in the next match.

Upper limb

An all-rounder suffered with a chronic shoulder impingement syndrome which would flare up after he had done much bowling or throwing. This would then affect the rest of his shoulder complex leading to infraspinatus and trapezius muscle spasm requiring mobilisation and massage treatment. Four elbow injuries occurred in the first week as a result of the players having to adapt to the large Australian fields by throwing the ball far distances. These "sprained" elbows healed quickly after 2 to 3 days of treatment.

Three players injured the soft tissues overlying the metacarpophalangeal (MCP) joints. The wicket keeper brusied the second MCP joint of his right hand by constantly having to catch the ball during practices and matches. Initial x-rays ruled out a fracture and a cortisone injection was given to relieve the pain and swelling and he continued playing with extra padding inside his gloves. The reserve keeper also injured his left hand in the same manner, yet his injury was not as severe. Another player bruised his fifth MCP joint of his left hand from constant fielding of the ball. Lastly, one player developed tendinitis of his extensor pollicis longus tendon in the right wrist. This responded well to cross-friction treatment, laser and ultrasound.

Of the four finger injuries, the most serious was that of the captain who was hit with the ball on his left thumb nail. The pain and swelling persisted for a couple of days regardless of continual puncturing of the nail to help it drain and only a week later when the nail came off, was he provided with some relief from the painful syndrome.

Lower limb

Four players bruised the front of their thigh as a result of being hit with the ball through their protective padding. One player strained his quadriceps muscle while 4 others reported mild pain and stiffness in their hamstrings which were treated on a precautionary basis. A fifth player slgithly strained his right hamstring during one of the matches and came off the field temporarily for treatment and strapping support. He was later treated with vigorous cross-frictions, ice and ultrasound and two days later played again without further worry. One player tore his left adductor longus muscle two weeks before the team left and received extensive treatment to

enable him to recover in time. During the tour his groin often became stiff and painful and required occasional massage and ultrasound treatment. However, during the final game, he subsequently strained the right groin while fielding and could not continue playing.

Another player had pain on the outside of his left knee, diagnosed as a lateral meniscal cyst, which was aggravated when bowling. On examining his bowling action and informing him to place his front foot in a more straightened position, his symptoms cleared up shortly. (However, it is thought that this change may have brought about a new injury to his ankle). Two others had injuries involving their iliotibial bands which did not completely clear up and required on-going maintenance treatment during the tour. Lastly, another developed popliteus tendinitis early on which responded well to treatment.

Injuries to the lower leg included two calf muscle strains, two achilles tendon strains, and mild shinsoreness (tibial stress syndrome) in one of the fast bowlers. The serious calf muscle strain occurred while the player was batting and unfortunately he could not come off the field immediately. He was treated extensively thereafter, yet unfortunately had to miss the next match as his injury had not healed sufficiently and the risk of further injury with important matches looming was too great. The wicket keeper developed a secondary achilles tendon strain as a result of his sprained lateral ankle ligaments. More so, his injury was also aggravated by the prolonged crouched position he had to field in and he only just recovered before the first match began. The shinsoreness was managed with ice, ultrasound and shock absorbing inner soles.

Two ankle sprains occurred in non-cricket related incidents, and recovered following ice, cross-frictions and ultrasound therapy. Lastly, an all-rounder injured his left tibialis posterior tendon about half way through the tour. He became aware of pain next to his left medial malleolus during footstrike of his bowling action. Initially it was thought that he had a posterior talar impingement injury (talar spur) and x-rays revealed the presence of an enlarged os trigonum. He was given a cortisone injection into the area and rested. However, the symptoms only got worse when he played again and the pain spread to the achilles tendon. On returning home, inflammatory exudate in the region of the tibialis posterior tendon was evident with an MRI scan.

THE CARIBBEAN TOUR

The team of 14 cricketers which toured the Caribbean Islands played three 1-day internationals and one 5-day test match against the West Indies team. The team followed the usual exercise procedures while on tour and three of the players had minor injuries carried over from the previous World Cup tour. A total of 15 injuries were reported with only 11 players requiring treatment. One player had 3 injuries, two players had 2 injuries while the other eight players each had 1 injury. The most commonly injured structures were the bones/joints followed by muscular injuries. The causes of injury were evently spread among batting (3), bowling (4) and fielding (5).

Head and neck

One player sustained a subluxed facet joint to his cervical spine during the 5-day test match when he ducked out of the way of a rising ball while batting. He had to continue batting for an hour before he could receive treatment in the form of heat, a manipulation, ultrasound and a muscle relaxant. This enabled him to continue in less discomfort and he later responded well to further treatment with spinal mobilisations.

Spine and trunk

Two bowlers were treated for chronic lumbar pain and stiffness. Another bowler injured his right costochondral joint of the fourth rib. He had collided with another player's head while body-surfing and when he had to bowl two days later, he broke down in his third over complaining of severe chest pain with breathing and much difficulty bowling. He immediately came off the field to apply ice to the chest and went for x-rays which excluded a cracked rib. His chest was largely swollen, yet following five days rest and treatment with ice, laser and ultrasound 4 times daily coupled with anti-inflammatory medication, his injury healed to the point where he played the test match with supportive strapping, yet no recurrence of the painful symptoms.

Table 1: Anatomical injury profile

	World Cup	West Indies
Anatomical site		
Head and neck	5%	13%
	3	2
Upper limbs	27%	27%
Shoulder	2	1
Elbow	4	—
Wrist/hand	4	1
Fingers	4	2
Trunk and spine	18%	27%
Chest/Abdomen	3	1
Spine	7	3
Lower limb	50%	33%
Hip	1	—
Thigh	13	2
Knee	5	2
Lower Leg	5	—
Ankle	4	—
Foot/Toes	—	1
Total	**56**	**15**
Injured Structures		
Bones/Joints	16	9
Muscles	23	3
Tendons	11	1
Ligaments	4	—
Cartilage	1	1
Soft tissue	1	1
Total	**56**	**15**

Upper limb

One player suffered a haematoma injury to his right wrist whereby on attempting to catch a batsman out he was struck on the volar surface causing a blood vessel to burst, with immediate swelling into the area. This had apparently occurred on a previous occasion and applying ice and a compression bandage to the wrist reduced the swelling and he could continue playing. Another player dislocated his distal interphalangeal joint of his right middle finger but this was easily reduced and treatment ensured he could play the test match 2 days later.

Lower limb

One player strained his rectus femoris muscle which hampered him for the first half of the tour as he could not rest it sufficiently. Another bowler mildly strained his right groin towards the end of the tour yet could continue playing. A third presented with symptoms of a mild synovial plica syndrome involving his right knee. He had a history of previous injury to the knee which required a menisectomy a few years back. The knee responded well to mobilisations, ultrasound and laser therapy. The last two injuries were both as a result of players being hit with the ball causing moderate periosteal and soft tissue bruising to the knee and dorsum of the foot respectively.

DISCUSSION

The injuries associated with the South African cricket team's tour to the World Cup and West Indies have been presented. This paper adds to the already present and growing amount of data reported in the literature on this subject. Tables 1 and 2 give an account of the anatomical injury profiles and the physiotherapy treatments given.

The incidence of injury associated with the World Cup tour was 3,5 per player while that of the Caribbean 1 injury per player. These figures support Morton's[3] hypothesis that the injuries encountered on cricket tours may be proportional to the length of the tour. Her results demonstated an injury incidence of just 1 per player for a squad of 17 players with a total of 22 injuries. Although the number of injuries seem to increase with the length of the tour, a more true perspective of the incidence may be found when the total number is compared to the number of players injured. This then adjusts the Caribbean tour incidence to 1,4 and the Natal tour to 1,7 per player. Applying the same adjustment to the tour of India[1] also results in an inci-

Table 2: Physiotherapy treatment modalities

	World Cup	West Indies
Players	16	14
Players treated	16	11
Treatments given	232	85
Treatment modalities		
Electrical		
Interferential	16	3
Ultrasound	176	60
Lasesr	85	42
Total	**277**	**105**
Manual mobilisations		
Peripheral	20	23
Spinal	23	17
Massage		
Non-specific	17	6
Frictions	85	13
Acupressure	13	18
Total	**158**	**77**
Ice	81	40
Strapping	29	10
Stretching exercises	15	—
Injections	4	—
Total	**129**	**50**
Total treatment modalities	***564***	***232***

Table 3: Causes of injury

	World Cup	West Indies
Batting	14	3
Bowling	11	4
Fielding	15	5
Running (not during cricket)	11	1
Other	5	2
Total	**56**	**15**

dence increase from 1 to 1,8 per player.

The lower limb was found to be the commonest area injured on the two tours (50% and 33%), followed by the upper limbs (27% and 27%), the trunk and spine (18% and 27%) and then the head and neck (5% and 13%). On both tours, fielding accounted for most of the injuries (20), followed by batting (17), bowling (15), non-cricket relating running (12) and other causes (7). (See Table 3).

In conclusion, it can be said that despite detailed preparation and precautionary measures, injuries will almost certainly result from the normal nature of the game and circumstances which cannot always be completely controlled. Therefore, it is clear that a continued awareness and vested interest in this field can only be heightened by reporting this data, which will hopefully lead to further insight into the management and treatment of cricket injuries and a reduction in the incidence of these injuries in the future.

Areas which may warrant further investigation include the incidence of injury related to intrinsic and extrinsic causes, identifying the high-risk structures associated with tours of varying lengths and injury side dominance among batsmen and bowlers. Effective measures to limit injury in the form of specialised training programmes, regular stretching plus prompt treatment will continue to benefit not only touring cricket teams but other tours of this nature and assist our cricketers in the international competitive arena.

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