RELATIONSHIP BETWEEN INCIDENCE AND MECHANISM OF INJURY AND AGE OF FEMALE VOLLEYBALL PLAYERS OF KERALA.

(UGC sponsored Minor Research Project report)

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Chapter I

INTRODUCTION

The game Volleyball was invented in 1895 by William G. Morgan in Massachusetts, USA, and was intended to be a less strenuous sport for local businessmen compared with basketball (Reeser, 2003). With approximately 200 million players, Volleyball is one of the largest and most popular team sports in the world. The FIVB, which was founded in Paris in 1947, currently comprises 218 member countries. The first World Championships were held in 1949 and, in 1964, volleyball became part of Olympic culture.

Volleyball is regarded as the only popular non-contact ball game played in teams. The players' position is either as one of the three front players, or at the back, also with three players. The front players' task is to attack and "spike" the ball, or "block" a ball, to prevent the ball crossing the net. The back row players, also known as "setters", have to "set" the ball for an attacking team-mate in the front row, or pass or "dig up" balls that have penetrated the block. The ball is not allowed to touch the playing surface on the defending team's side of the net and the way to score is to force the opposing team to fail in keeping this rule. To make the game more interesting and induce more rally in the game, the 'Libero', player was introduced, who played major role in the back court defense of the team.

The incidence of injuries might be expected to be low in the sport. Nevertheless, volleyball is a sport involving rapid and forceful movements of the body as a whole, both horizontally and vertically, and because of the large forces involved in such movements it is inevitable that injuries occur. It has been recommended that sports scientists, coaches and strength and conditioning professionals need to be aware of the specific positional requirements in volleyball when designing conditioning programmes (e.g. middle blockers tend to suffer from "jumper's knee" more than players in other positions and a prevention programme for "jumper's knee" is therefore recommended for middle blockers) (Duncan et al., 2006; Reeser et al., 2006).

Statement of problem

This study aims to record the injury rate in all age categories of Kerala female volleyball players, examine the overall incidence of volleyball injuries, and clarify the role of age in injury mechanism and occurrence. Moreover, information related to injuries such as occurrence during training or competition, time of season, severity, anatomical location and diagnosis, number of recurrent injuries, playing position and factors related to the injury occurrence was recorded.

Delimitation

The study was limited to the female volleyball players of Kerala, who represented the teams in the various state level competitions, within the age group of 17 – 25, with mean score for the 125 players

Limitation

The degree of information provided by the subjects was not possible to assess. Though orientation regarding the anatomical location, nature of injury, the response might be vague beyond the control of the investigator due to lack of knowledge of the subject.

Hypothesis

On the basis of the literature gone through, research finding and the scholars understanding of the problem, following hypothesis were formulated:

- There will be significant difference be the occurrence of injury in relation to age of female volleyball player.
- There will be some relation between the mechanism of injury and age of female players.
- There may be difference between the anatomical locations of the injury with different age category.
- There will be difference between the phases of occurrence of injury with novice players.

Definition and explanation of important terms

Injury

Injury will be defined as any incident occurring during the competition or training period that caused the player to miss a subsequent match or training session. Injuries will be classified into three grades of severity, a) Mild (absence from training or competition for less than one week), b) Moderate (absence from training or competition for one week to one month), c) Major (absence from training or competition for more than one month).

Significance of study

Despite the large number of studies on injury incidence in volleyball and on the factors related to them, there is a gap concerning the influence of age on the injury rate related to the factors such as type, severity and anatomical location of injuries, if they occurred during practice or a game, and if they were recurrent or not. This study aimed to record the injury rate in all age categories of Kerala female volleyball players and to clarify the role of age in injury occurrence and drop outs. The purposes of this study is to record the injury incidence and mechanism in all age categories of female volleyball players and to clarify the role of age in injury occurrence. The injury incidence rate, severity, diagnosis and the anatomical location of the injuries, which occurred during practice and in competition during the championship period are studied.

Taken together, there is every reason to emphasis on the prevention of injuries in volleyball and to implement prevention programmes for young players as early in their career as possible. Acute and overuse injuries have been referred by volleyball players. Acute injuries are most related to the ankle (e.g ankle sprains) and knee (ligament injuries). Moreover, overuse injuries are also frequent complaints that send female volleyball players to their athletic trainers An important purpose of sports injury epidemiology is to supply information about injuries that occur frequently and have serious consequences, and to describe their aetiology, in order to provide a basis for preventive measures. In view of the global participation rate and the relatively high incidence of volleyball injuries when comparing volleyball with high intensity contact sports, preventive measures are definitely warranted in volleyball. Studies on volleyball injury incidence during training and match play, however, have mainly been retrospective, and reliable information

from season long prospective studies is scare and this study will help in undermine the necessity in the area.

Chapter II

REVIEW OF RELATED LITERATURE

A review of the literature related to the present study available in the books is presented here. Further an intensive search was done through e-journals to find out relevant literatures are presented here to provide background material to evaluate the significance of this study as well as interpret the findings.

Duncan et al., (2006) observed the different positional roles in volleyball, a difference in physiological characteristics has also been observed between the players. The incidence of injuries might be expected to be low. Nevertheless, volleyball is a sport involving rapid and forceful movements of the body as a whole, both horizontally and vertically, and because of the large forces involved in such movements it is inevitable that injuries occur. It has been recommended that sports scientists, coaches and strength and conditioning professionals need to be aware of the specific positional requirements in volleyball when designing conditioning programmes (e.g. middle blockers tend to suffer from "jumper'sknee" more than players in other positions and a prevention programme for "jumper's knee" is therefore recommended for middle blockers)

Aagaard & Jørgensen, 1996; Agel et al., 2007 studied that although the overall injury incidence in volleyball appears to be relatively low compared with other team sports, the injury incidence has increased at the sport of volleyball has become more physically demanding with time. More training hours, a higher intensity of play and more risks being taken during matches have been suggested as factors contributing to a higher distribution of injuries.

Hägglund et al. (2005) demonstrated that the injury incidence and severity of the injuries can differ between countries, in the same sport. Since volleyball is a modest sport in Sweden, with resources probably far smaller than those in some other countries, it is not possible to conclude that Swedish volleyball players have the same injury panorama as those involved in international volleyball.

George Tsigganos et.al (2006) in a study found that almost half of the male volleyball players sustained one or more injuries during the season. The prevalence of injuries for youth

and junior athletes was lower than that for seniors. The results also revealed differences in injury occurrence rate when the total exposure time for each age category has been taken under consideration. The authors suggest that any findings in injury occurrence rate must be interpreted in relation to the total exposure time in order to have more realistic conclusions. Age was not an important factor influencing injury incidence related to the severity of injury or the season that it occurred. Important factors related to injury occurrence were 'step on other's foot' and 'incorrect sprawls' while more injuries were sustained by outside hitters, middle hitters and universals. Finally, the majorities of injuries were of moderate severity, were ankle sprains and occurred during training, and during the competitive period.

M Verhagen et. al. (2003) found the overall injury incidence in volleyball was 2.6 per 1000 playing hours. The incidence of acute and overuse injuries was 2.0 and 0.6 per 1000 playing hours, respectively. The ankle sprain is clearly the most common injury in volleyball, accounting for 41% of all volleyball related injuries, with an injury incidence of 1.0 per 1000 playing hours. Although our study was limited to injuries causing absence from volleyball, ankle sprains should be of particular interest in studies on prevention strategies. Previous injury seems to be an important risk factor for ankle sprains.

P. Malliou et.al. (2006) found that almost half of the female volleyball players sustained one or more injuries during the season. Even if the prevalence of injuries for youth and junior athletes was lower than that for seniors, the results revealed no differences in injury rate considering the total exposure time for each age category. We suggest that any findings in injury occurrence rate be interpreted in relation to the total exposure time in order to have more realistic conclusions.

Sofia Ryman Augustsson, (2006), observed that one in every two elite volleyball players incur an injury during a season, which indicates that the risk of suffering an injury in elite volleyball is relatively high. Most injuries do not, however, keep the players away from training or game play for more than a short period of time (≤one week). The ankles, knees and back are the most frequently injured regions. Most elite volleyball players take part in some kind of preventive action, especially strength training. The level of supervision in these preventive programmes is, however, relatively limited (58% without supervision).

Aagaard & Jørgensen, 1996; Agel et al., 2007: Although the overall injury incidence in volleyball appears to be relatively low compared with other team sports, the injury

incidence has increased as the sport of volleyball has become more physically demanding with time. More training hours, a higher intensity of play and more risks being taken during matches have been suggested as factors contributing to a higher distribution of injuries.

Bahr & Bahr, 1997; Verhagen et al., 2004 The injury incidence was noted as 1.7 in 1993 and 2.4 in 2002 for women and 1.7 in 1993 and 3.0 in 2002 for men. The prevalence of the injuries ranges from 0.22-1.1injuries/player/season for women. Most injuries appear to be related to the three front players (attackers and blockers) and spiking and blocking are the skills most often associated with injury.

Chapter III

PROCEDURE

Selection of subjects

The sample population in this survey comprised 125 volleyball players, who played in the Kerala State Volleyball championship in senior, junior and youth ranks and the leading department, college, academy team home ground during the season 2012-13. All the teams, agreed to participate and verbal information was given to each team coach. The teams were introduced to the survey at the beginning of the season, through their team coach, and the data were collected retrospectively. Written information was given to each player and informed consent was obtained. The inclusion criteria were elite female volleyball players included in the regular team line-up (including substitutes). Seventy per cent of the players returned the questionnaire. The mean (± SD) age of the players was 20 ± 4. The mean weight was 58 ± 7 kg for the women. The mean height was 172 ± 6 cm for the women.

Subjects with illness or injury to the musculoskeletal system during the past two months, which were thought possibly to affect the test results, were excluded. Elite athletes (individuals training/competing at a high level) were also excluded. The participants' age, height, weight and physical activity level were documented.

Selections of variables & Collection of data

Injury and exposure registration

In the study a retrospective questionnaire for injury data collection was used. The coach or a volunteer from each team was responsible for the distribution and subsequent collection of the questionnaires and for ensuring that the questionnaires were returned by hand or post the author. The questionnaire comprised 15 questions, divided into two parts. Part one included data relating to team affiliation and the players' gender, age, weight and height. Each player was also asked to report the number of years of volleyball training, the number of training hours per week and her/his training routines. Part two included six identical injury profile subsections, in which the players were asked to report each of their previous injuries. The data that were collected included whether the injury occurred during training or a match, the skill performed, the injured player's court position and the anatomical location of the injury. Questions concerning the ability of the player to complete the particular match or training

session and whether the injury resulted in any absence from training and/or matches were also recorded. The questionnaire was designed by the author and preliminarily tested on a team that was not included in the study to obtain views about the design and to achieve face validity. A final version of the questionnaire was then constructed and used in the present study. The skill terminology was thought to be familiar to the players and, as a result, it was not defined in the questionnaire answered by the players.

Design and measurements

At the start of the season (September 2012) all players completed a questionnaire on demographic variables, sports participation (volleyball and other sports), the use of preventive measures, and previous injuries. This questionnaire (except for the demographic variables) was repeated at the end of the season (February 2013). Exposure was recorded by the coach on an exposure form. Coaches noted the total duration of each training session and match, and classified the level of participation of each player (that is, in terms of full, three quarters, one half, one quarter, or no participation). If the player did not participate fully, the coach noted the reason - that is, being injured, ill, or absent for other reasons.

On form the player was asked to provide information on the injury location, injury type, diagnosis of the injury, direct cause of the injury, preventive measures used at the time of the injury, first aid given, and subsequent medical treatment.

Result & Discussion

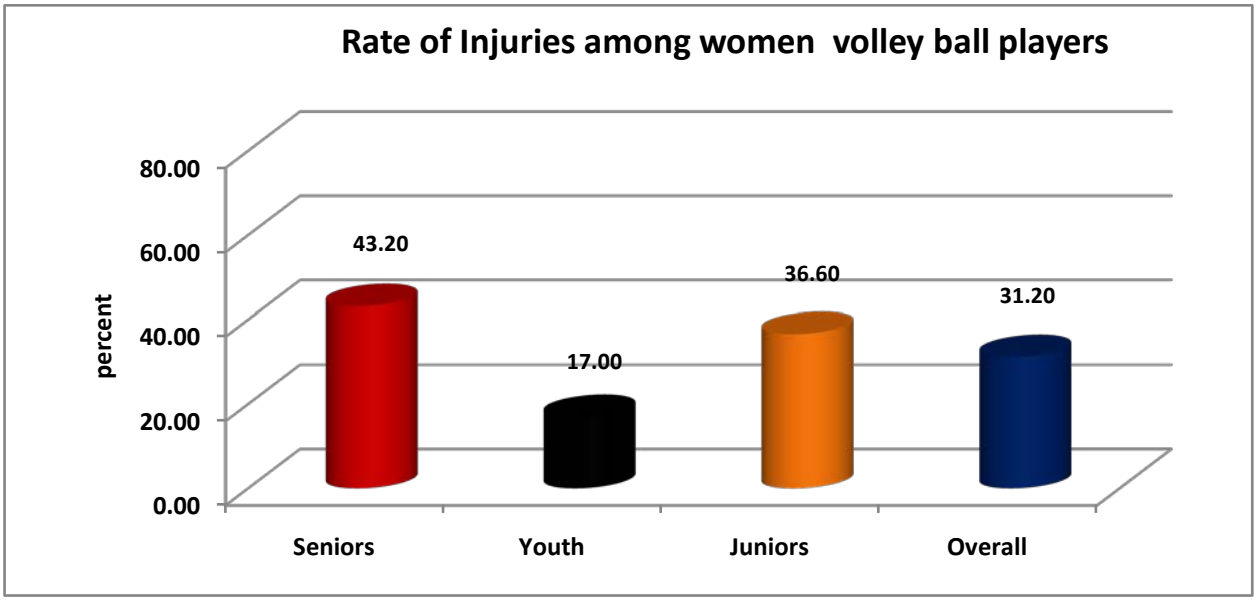
Rate of Injury among women volleyball players

Table 1. Rate of Injury

	Frequency	Percent
No	86	68.8
Yes	39	31.2
Total	125	100.0

Among the one hundred twenty five players who responded to the study, it showed that 39 players has been exposed to injury in different age category. Thus in general about 31% of the women volleyball players are getting injured.

Figure 1.



Injury and age

Occurrence of injury according to various age groups of women volleyball players

Table 2. Occurrence of injury

Category	Number	Percentage
Seniors	16	43.2
Youth	8	17
Juniors	15	36.6

It can be seen that the rate of injury is greatest among seniors and then among juniors. It is lowest among youth.

Severities of Injuries among Women volley ball players

Table 3. Severity of Injuries

	Frequency	Percent
Mild	21	53.8
Moderate	14	35.9
Major	4	10.3
Total	39	100.0

Types and incidence of injuries

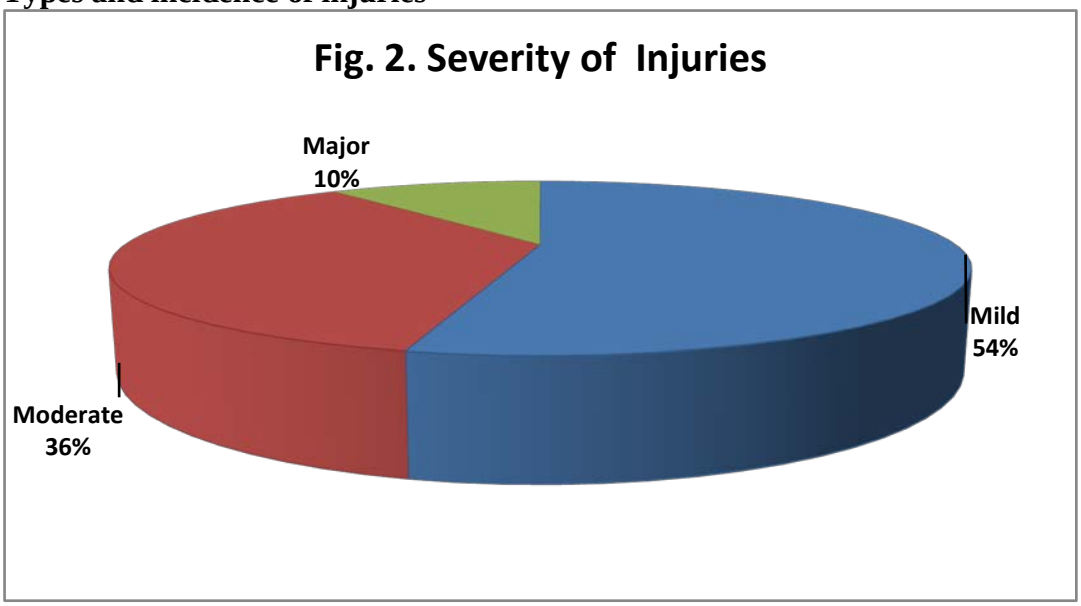


Table 4. Types of Injuries

	Frequency	Percent
Ankle Sprain	18	46.2
Joint Pain	11	28.2
Contusion	8	20.5
Spasm	1	2.6
Fracture	1	2.6
Total	39	100.0

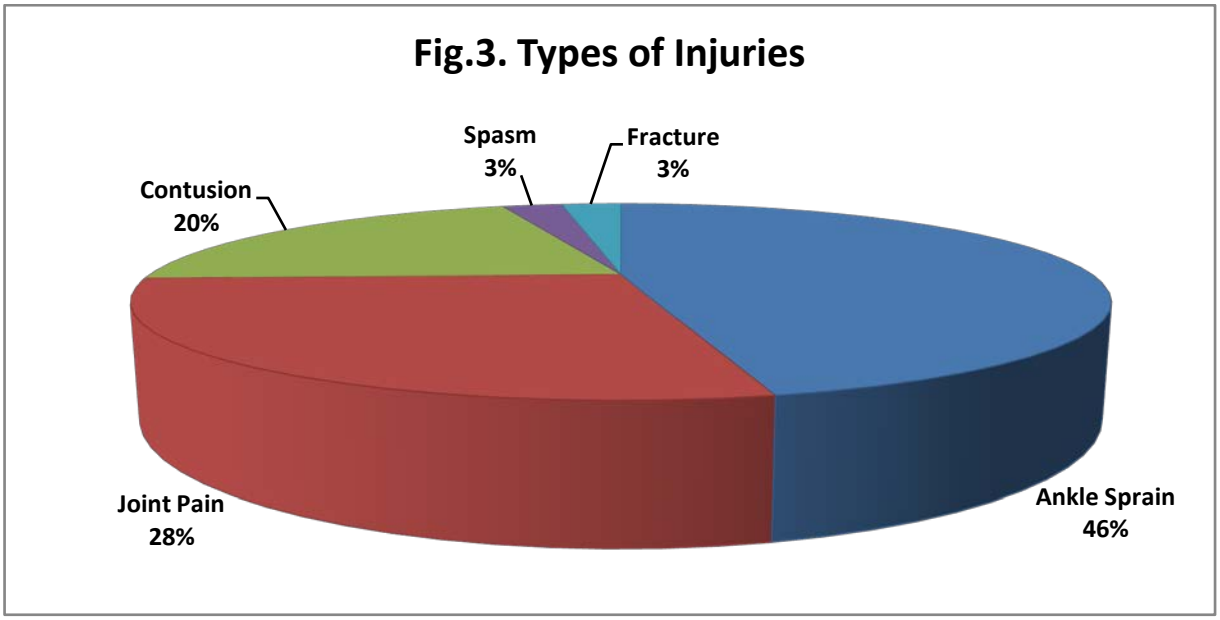
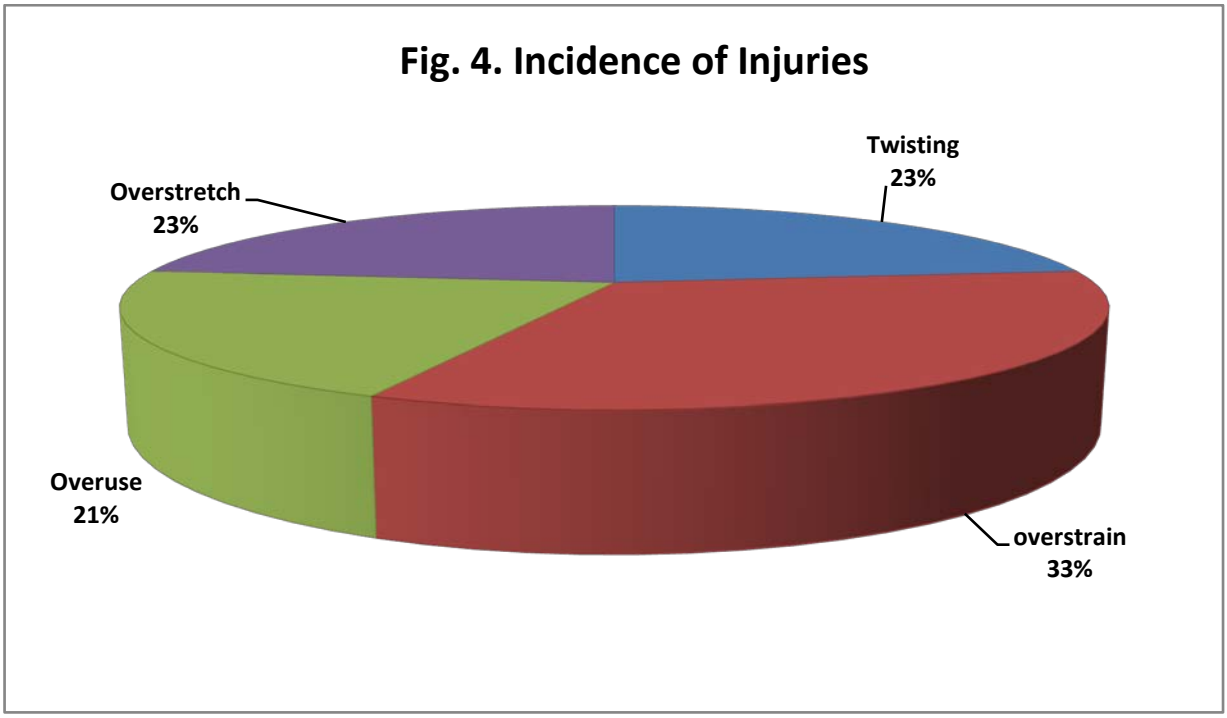


Table 5. Incidence of Injury

	Frequency	Percent
Twisting	9	23.1
overstrain	13	33.3
Overuse	8	20.5
Over stretch	9	23.1
Total	39	100.0



Injury and player's position

Table 6. Position Playing

	Frequency	Percent
Blocker	14	35.9
Universal	8	20.5
Attacker	9	23.1
Libero	6	15.4
Setter	2	5.1
Total	39	100.0

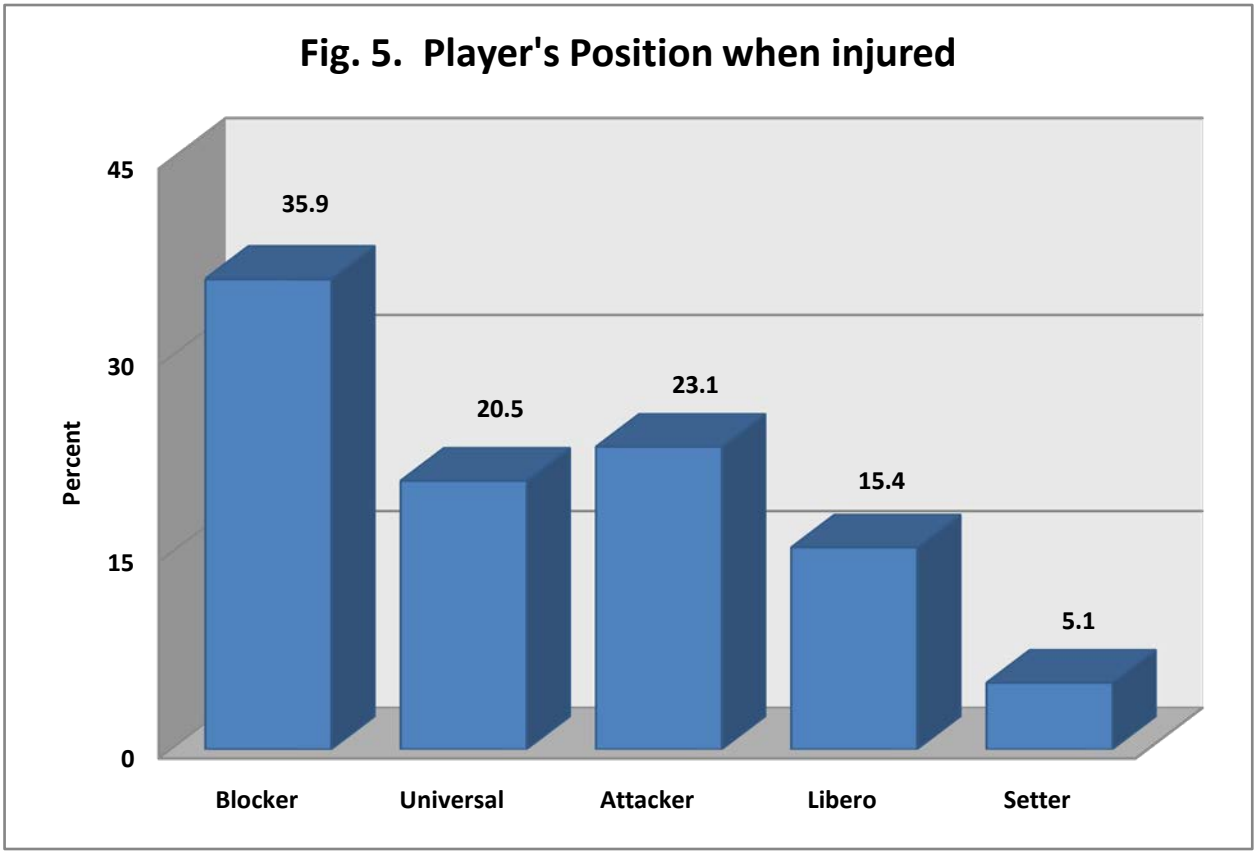
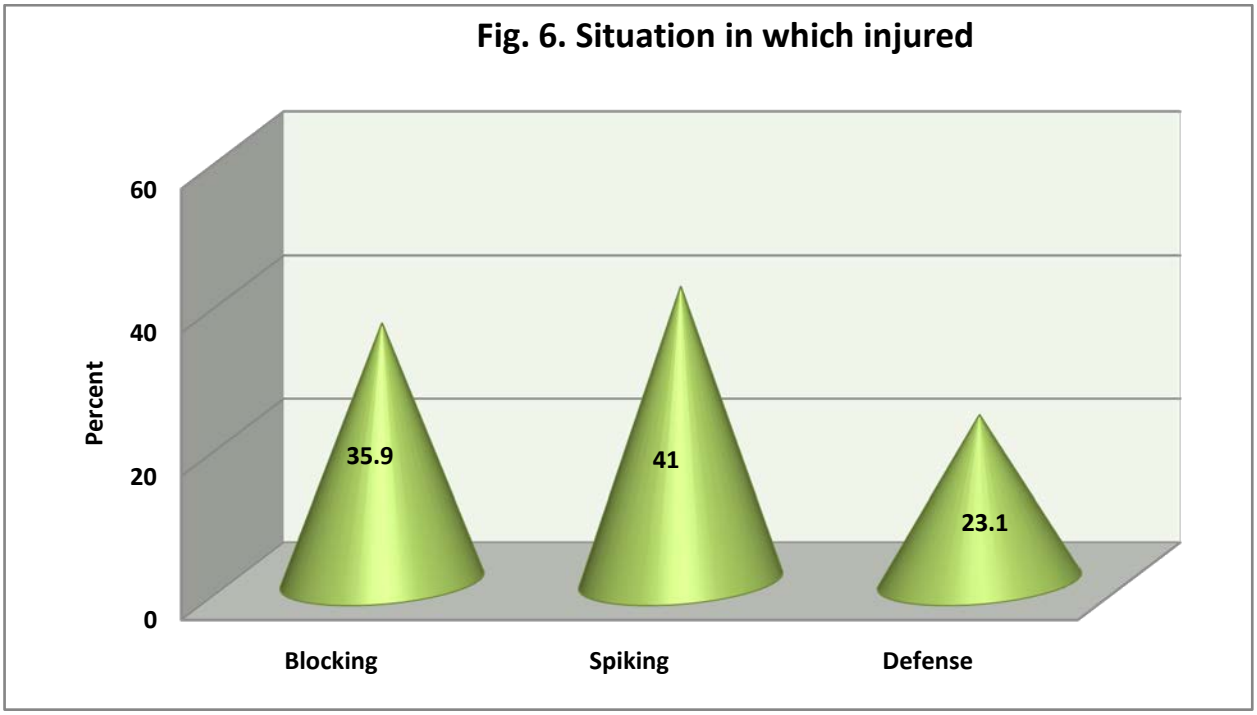


Table 7. Situation Got injured

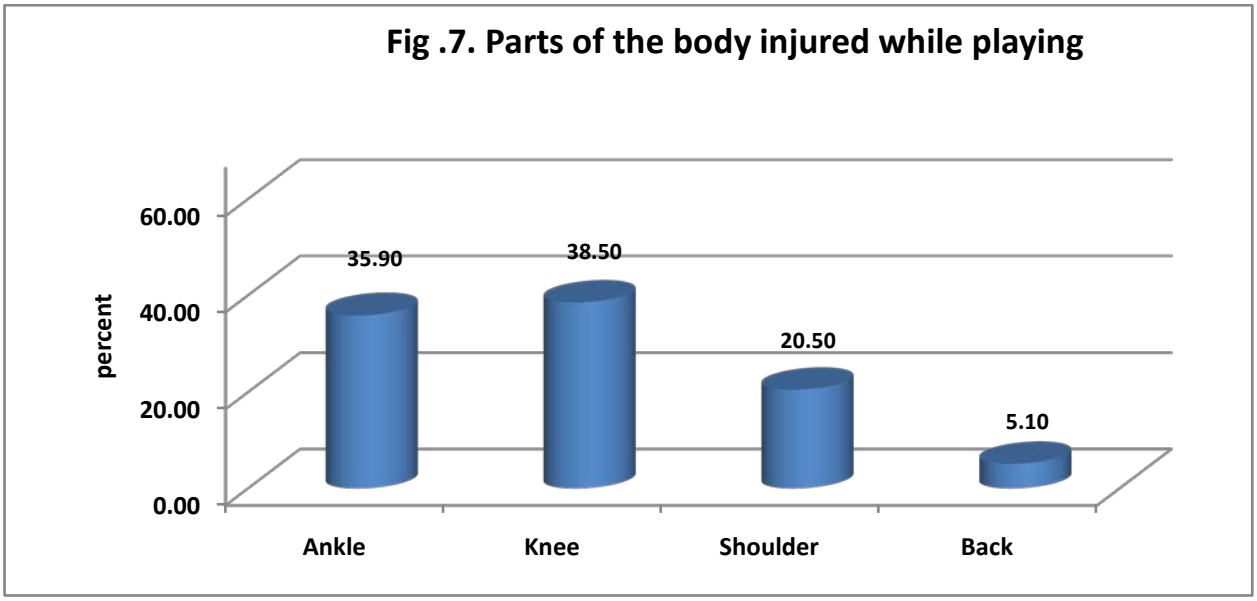
	Frequency	Percent
Blocking	14	35.9
Spiking	16	41.0
Defense	9	23.1
Total	39	100.0



Part of the body injured

Table 8. Part of the Body

	Frequency	Percent
Ankle	14	35.9
Knee	15	38.5
Shoulder	8	20.5
Back	2	5.1
Total	39	100.0



Statistical Tests

Testing Association between age and occurrence of injury.

Statistical tool used is the chi-square test.

Null hypothesis: There is no association between age and occurrence of injury.

Table 9. Age of Player & Occurrence of Injury Cross tabulation

			Occurrence of Injury		Total
			No	Yes	
Age of Player	Seniors	Count	21	16	37
		%	56.8%	43.2%	100.0%
	Youth	Count	39	8	47
		%	83.0%	17.0%	100.0%
	Juniors	Count	26	15	41
		%	63.4%	36.6%	100.0%
Total		Count	86	39	125

Table 9. Age of Player & Occurrence of Injury Cross tabulation

			Occurrence of Injury		
			No	Yes	Total
Age of Player	Seniors	Count	21	16	37
		%	56.8%	43.2%	100.0%
	Youth	Count	39	8	47
		%	83.0%	17.0%	100.0%
	Juniors	Count	26	15	41
		%	63.4%	36.6%	100.0%
Total		Count	86	39	125
		%	68.8%	31.2%	100.0%

Chi-Square Tests

	Value	df	Significance
Pearson Chi-Square	7.456	2	.024
N of Valid Cases	125		

Conclusion: The value of the chi-square statistic is 7.456 which is significant at 5% level. Hence we reject the null hypothesis. That is there is association between age and occurrence of injury.

Testing Association between age and types of injury.

Statistical tool used is the chi-square test.

Null hypothesis: There is no association between age and types of injury.

Table 10. Association between age and types of injury cross tabulation

			Age Group			
			Seniors	Youth	Juniors	Total
Type of Injury	Ankle Sprain	Count	7	5	6	18
		% within Age Group	43.8%	62.5%	40.0%	46.2%
	Joint Pain	Count	5	0	6	11
		% within Age Group	31.2%	.0%	40.0%	28.2%
	Contusion	Count	4	1	3	8
		% within Age Group	25.0%	12.5%	20.0%	20.5%
	Spasm	Count	0	1	0	1
		% within Age Group	.0%	12.5%	.0%	2.6%
	Fracture	Count	0	1	0	1
		% within Age Group	.0%	12.5%	.0%	2.6%
Total		Count	16	8	15	39
		% within Age Group	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Significance
Pearson Chi-Square	11.814	8	.160
N of Valid Cases	39		

Conclusion: The value of the chi-square statistic is 11.814 which is not significant at 5% level. Hence we accept the null hypothesis. That is there is no association between age and types of injury.

Testing Association between age and severity of injury.

Statistical tool used is the chi-square test.

Null hypothesis: There is no association between age and severity of injury.

Table No.11. Association between age and severity of injury Crosstabulation

			Age Group			Total
			Seniors	Youth	Juniors	
Severity of Injury	Mild	Count	13	6	2	21
		% within Age Group	81.2%	75.0%	13.3%	53.8%
	Moderate	Count	3	2	9	14
		% within Age Group	18.8%	25.0%	60.0%	35.9%
	Major	Count	0	0	4	4
		% within Age Group	.0%	.0%	26.7%	10.3%
Total		Count	16	8	15	39
		% within Age Group	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Significance
Pearson Chi-Square	17.871	4	.001
N of Valid Cases	39		

Conclusion: The value of the chi-square statistic is 17.871 which is significant at 5% level. Hence we reject the null hypothesis. That is there is association between age and severity of injury.

Discussion

The results of the present study revealed that 31% of the women volleyball players sustained one or more injuries during the season. The study shows that the senior players (43.2%) are susceptible to injuries when compared to youth (17.0%), junior (36.6) and sub juniors (31.2%).

When the results have been dissected in relation to age, the prevalence of injuries (0.30 injuries/player/year) for sub junior to senior players (0.37 injuries/player/year) was significantly lower than that of older players (more than 18 years old, 0.81 injuries/player/year). In order to clarify this issue, the authors of the present study examined the injury occurrence rate in relation to the total exposure time of the athletes (total amount of training hours and game play) for each age category. In conclusion, the authors suggest that

any findings in injury occurrence rate must be interpreted in relation to the total exposure time in order to have more realistic conclusions.

Gisslen et al (**Gisslèn, Gyulai, Söderman, & Alfredson,** 2005) agree with the results of the present study that injury occurrence is age related and junior volleyball players have a lower injury rate than the senior ones. Several studies have reported an increase in the number of overuse injuries because of an increase in the number of training hours. Aagaard and Jorgensen (1996) reported that the number of training hours had increased by more than 50% during a 10 year period and Ferretti et al (Ferretti, Puddu, Mariani, & Neri, 1984) found that jumper's knee was more common in volleyball players who play more than four times a week.

Age was not an important factor influencing injury incidence related to the severity of injury or the season that it occurred and there was no association between the age and the type of injury that occurred to the players. The majority of injuries were of moderate severity, fewer were of mild severity and very few were of major severity. The result also showed that there is no influence of age on the severity of injury among the players. This result is not in accordance with that of Augustsson et al (2006) and of Aagaard et al (1996) who found that the majority of injuries were of minor severity but they included not only men but also women in their studies.

Drexler et al (Drexler, Briner, & Reeser J. (2001) stated that there does appear to be an association between higher level of play and increased frequency of injury. Higher skill levels subject athletes to greater injury risk. Elite athletes train for more hours, so the cumulative stress on their bodies may make them more vulnerable to injury. Similarly, Gisslen et al (2005) noticed that almost all the painful tendons belonged to individuals in the second and third grades, where there is more and heavier weight training and more match specific training compared to the first grade.

Moreover when calculating exposure time in retrospective studies one common problem that is usually associated with the results is the subjective information that could lead to an over or under-estimated report. The problem is that exposure time for game play is rarely calculated individually, even in prospective studies the actual amount of time during which

each player is at risk of injury is difficult to investigate. The true exposure time can therefore be higher or lower than that reported, which complicates the comparison with other studies.

Ankle injuries accounted for almost half of all acute injuries recorded in the present study, and previous studies have also shown that ankle sprains account for one quarter to one-half of all acute injuries in volleyball (Gangitano et al., 1981; Hell & Schonle, 1985; Gerberich, et al., 1987; Yde & Nielsen, 1988; Schafle, et al., 1990; Bhairo, Nijsten, Van Dalen, & ten Duis, 1992; Bahr, Lian, Karlsen, & Øvredo 1994; Solgard, Nielsen, Moller-Madsen, Jacobsen, Yde, & Jensen, 1995). In the present study almost 18% of the injured athletes were injured twice or three times during the season, while almost 22% of the injuries were recurrent episodes. Similarly (Bahr et al., 1994) found that in 78% of the cases, the players had a history of at least one previous ankle injury during their career.

Another important finding of the present study was the factors related to injury occurrence. “Step on other’s foot” and “incorrect sprawls” were the two more significant injury factors. These two factors are usually associated with blocking, followed by spiking, which are the most frequent skills in volleyball that require jumping and are associated with high incidence of ankle injuries (Schafle et al 1990; Watkins & Green, 1992; Briner & Benjamin, 1999). A 1987 review of outpatient rehabilitation records of 106 patients treated for volleyball injuries found that 63% of the injuries were related to jumping (Goodwin-Gerberich, Luhmann, Finke, Priest, & Beard, 1987). The most common mechanism of ankle injury in volleyball is when a player’s foot intrudes into the opponent’s side of the court as long the foot remains in contact with the line that runs directly beneath the net. When this happens, the usual result is an inversion injury to the lateral collateral ligament complex of the blocker’s ankle (Briner & Benjamin, 1999).

Concerning the playing position the present study revealed that the majority of injuries occurred in middle hitters (blocker), outside hitters (attacker) and universals. All of them are responsible for blocking, hitting and generally are staying for more playing time in the court (Selinger, 1987). The results of the present study are in agreement with many authors reporting that defense is associated with a smaller number of injuries, and serving, passing and setting with even fewer. (Goodwin-Gerberich, et al., *1987*; Schafle et al 1990; Watkins & Green, 1992; Briner & Benjamin, 1999).

Another interesting finding of the present study was that most injuries occurred during training rather than during a game, results which are in accordance with Augustsson et al (2006). This result seems logical since players spent more time training than competing. The results also revealed that a higher injury incidence rate has been observed during the competitive period related to the preseason period and the post season period. This finding might be due to the fact that the training load in the competitive period is usually bigger and requires more effort resulting in generally more severe fatigue. These high demands make athletes function under more pressure not only physically but also psychologically, resulting in anxiety and tension (Andersen, 2001).

Conclusion

The main finding of this study was that almost half of the female volleyball players sustained one or more injuries during the season. The prevalence of injuries for youth and junior athletes was lower than that for seniors. The results also revealed differences in injury incidence rate when the total exposure time for each age category has been taken under consideration. The authors suggest that any findings in injury occurrence rate must be interpreted in relation to the total exposure time in order to have more realistic conclusions.

Age was not an important factor influencing injury incidence related to the severity of injury or the season that it occurred. Important factors related to injury occurrence were ‘step on other’s foot’ and ‘incorrect sprawls’ while more injuries were sustained by middle hitters(blocker), outside hitters(attacker), and universals. Finally, the majority of injuries were of moderate severity, were ankle sprains and occurred during training, and during the competitive period.

APPENDICES

FEED BACK FORM

STUDY THE RELATIONSHIP BETWEEN INCIDENCES, MECHANISM OF INJURY AND AGE OF FEMALE VOLLEYBALL PLAYERS OF KERALA.

Study under taken by:

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FEEDBACK FORM

- Name of Athlete:…….
- Team affiliation……..
- Participant No.
- Age:…… Date of Birth:……
- Height (In cm):……. Weight (In Kg):……
- Years of participation:…….

Part 1

- At what age you started playing volleyball ……..year
- How many times per week do you train volleyball? .....time, per week
- How many hours per week do you train volleyball?.....hours, per week
- Are you engaged in other type of sporting activity other than volleyball? Yes/No
  If yes what type of activity? .....

- Highest achievement: International/ National / State/ District/ Inter school, college.
- Do you perform some kind of preventive drills like conditioning, plyometrics, technique, skill etc:
  During pre season? Yes/ no

  If yes (can choose more than one option): conditioning/plyometrics/Technique skills

  During season? Yes/ no

  If yes (can choose more than one option): conditioning/plyometrics/Technique skills

- If you perform prevention programme, is it performed with or without, under the supervision of Coach / Physical trainer
- Injury during the past season: Yes/ No (if yes give details)

Part 2

- Injury during the present season: Yes/ No
- Category of Injury:
    - Mild (absent from training for less than three days)
    - Moderate (absent from training from one to three weeks)
    - Major (absent from training for more than three weeks)
- Type of Injury: Sprain, strain, dislocation, joint pain, fracture, contusion, spasm, others.
- Incidence of injury: fall, collision, twisting, hit, overstretch, over strain, overload, others
- At which point did you get injured?
    - During training
    - During warm up before match
    - During 1^{st} & 2^{nd} set
    - During 3^{rd} set
    - During 4^{th} & 5^{th} set
- The injury occurred gradually
- What position do you play? Setter/ blocker/attacker/ universal/ libero
- In what kind of situation did you get injured?
    - Blocking Spiking Setting Serving
    - Defense Do not know Others……
- Were you in contact with other player when you got injured? Yes/ No
- What player position did you had when you got injured?
    - Setter Left/right front row Centre Backline Others
- What part of your body part was injured?
    - Head Face Neck Chest Shoulder
    - Elbow Hand Wrist Finger Hip
    - Groin Back Thigh Knee Lower leg
    - Ankle Foot Other body region
- Complete recovery time:
- Recurrence:
- Phase of the season: Preparation / competition / post competition

REFERENCES

Aagaard, H., & Jorgensen, U. (1996). Injuries in elite volleyball. *Scand J Med Sci Sports, 6*, 228-232.

Andersen, M. (2001). Prevention to action and the prevention of future injury. In J. Crossman (ed.), *Coping with sports injuries. Psychological strategies for rehabilitation* (pp 168-170). New York: Oxford University Press

Augustsson, S. R., Augustsson, J., Thomee, R., & Svantesson, U. (2006). Injuries and preventive actions in elite Swedish volleyball. *Scand J Med Sci Sports, 16*, 433-440.

Bahr, R., & Bahr, I. A. (1997). Incidence of acute volleyball injuries: a prospective cohort study of injury mechanisms and risk factors. *Scand J Med Sci Sports, 7*, 166-171.

Bahr, R., Lian, Ø., Karlsen, R., & Øvredo. R. V. (1994). Incidence and mechanism of acute ankle inversion injuries in volleyball-a retrospective cohort study. *Am J Sports Med, 22*, 601-604.

Bhairo, N. H., Nijsten, M., Van Dalen, K. C., & ten Duis, H. J. (1992). Hand injuries in volleyball. *Int J Sports Med, 13*, 351-354.

Briner, W., & Benjamin, H. (1999). Volleyball injuries. Managing acute and overuse disorders. *Phys Sportsmed, 27* (3), 48-60.

Cook, J. L., Khan, K. M., Kiss, Z. S., & Griffiths, L. (2000). Patellar tendinopathy in junior basketball players: a controlled clinical and ultrasonographic study of 268 patellar tendons in players aged 14–18 years. *Scand J Med Sci Sports, 10*, 216–220.

De Loes, M. (1990). Medical treatment and costs of sports related injuries in a total population. *Int J Sports Med, 11*, 66-72.

Drexler, D., Briner, W., & Reeser, J. (2001). Volleyball. In E. Shamus, J. Shamus (Ed.) *Sports injury. Prevention and Rehabilitation* (pp 89-95). New York: McGraw-Hill. Medical Publishing Division.

Ekstrand, J., & Tropp, H. (1990). The incidence of ankle sprains in soccer. *Foot Ankle, 11*, 41-44.

Ekstrand, J. & Karlsson, J. (2003). Editorial. *Scan J Med Sci Sports, 13*, 147-149.

Ferretti, A., De Carli, A., & Fontana, M. (1998). Injury of the suprascapular nerve at the spinoglenoid notch. The natural history of infraspinatus atrophy in volleyball players. *Am J Sports Med*, 26, 759-763.

Ferretti, A., Puddu, G., Mariani, P. P., & Neri, M. (1984). Jumper´s knee: an epidemiological study of volleyball players. *Physician Sports Med, 12*, 97-103.

Fredberg, U., & Bolvig, L. (2002). Significance of ultrasonographically detected asymptomatic tendinosis in the patellar and achilles tendons of elite soccer players. *Am J Sports Med, 30* (4), 488-491.

Gangitano, R., Puvirenti, A., & Ardito, S. (1981). Lesioni traumatiche da pallavollo: Rilievi clinico-statistici. *It J Sports Traumatol, 3,* 31-34.

Gerberich, S. G., Luhman, S., Finke, C., Priest, J. D., Beard, B. J. (1987). Analysis of severe injuries associated with volleyball activities. *Phys Sports Med, 15*, 75-79.

Gisslèn, K., Gyulai, C., Söderman, K., Alfredson, H. (2005). High prevalence of jumper´s knee and sonographic changes in Swedish elite junior volleyball players compared to matched controls. *Br J Sports Med, 39*, 298-301.

Goodwin-Gerberich, S. G., Luhmann, S., Finke, C., Priest, J., & Beard, B. (1987). Analysis of severe injuries associated with volleyball activities. *Phys Sportsmed, 15* (8), 75-79.

Hell, H., & Schonle, C. (1985). Ursachen und prophylaxe typischer volleyballverletzungen. *Z Orthopaedische, 123*, 72-75.

Keller, C. S., Noyes, F. R., Buncher, C. R. (1987). The medical aspect of soccer injury epidemiology. *Am J Sports Med, 15*, 230-237.

Kirialanis, P., Malliou, P., Beneka, A., Gourgoulis, V., Giofstidou, A., & Godolias, G. (2002). Injuries in artistic gymnastic elite adolescent male and female athletes. *J Back Musculoskeletal Rehabil, 16* (4), 145-151.

Kirialanis, P., Malliou, P., Beneka, A., & Giannakopoulos, K. (2003). Occurrence of acute lower limb injuries in artistic gymnasts in relation to event and exercise phase. *Br J Sports Med, 37* (2), 137-139.

Lian, Ø., Holen, K. J., Engebretsen, L., & Bahr, R. (1996). Relationship between symptoms of Jumper' knee and the ultrasound characteristics of the patellar tendon among high level male volleyball players. *Scand J Med Sci Sports, 6*, 291-296.

Lian, Ø., Refsnes, P. E., Engebretsen, L., & Bahr R. (2003). Performance characteristics of volleyball players with patellar tendinopathy. *Am J Sports Med, 31*, 408-413.

Maffulli, N., King, J. B., & Helms, P. (1994). Training in elite young athletes the Training of young athletes (TOYA) study: injuries, flexibility and isometric strength. *Br J Sports Med, 28* (2), 123-136.

Schafle, M. D., Requa, R. K., Patton, W. L., Garrick, J. G. (1990). Injuries in the 1987 National Amateur Volleyball Tournament. *Am J Sports Med, 18*, 624-631.

Schultz, L. K. (1999). Volleyball. *Phys Med Rehabil Clin N Am, 10*, 19-34.

Selinger, A. (1987). *Power Volleyball* (pp 27-38). New York: St. Martin´s Griffin.

Solgard, L., Nielsen, B. A., Moller-Madsen, B., Jacobsen, B. W., Yde, J., & Jensen, J. (1995). Volleyball injuries presenting in casualty: a prospective study. *Br J Sports Med, 15,* 200-203.

Verhagen, E., Van der Beek, A., Bouter, L., Bahr, R., Van Mechelen, W. (2004). A one season prospective cohort study of volleyball injuries. *Br J Sports Med, 38,* 477-481.

Watkins, J., Green, B. N. (1992). Volleyball injuries: a survey of injuries of Scottish National League male players. *Br J Sports Med, 26* (2), 135-137.

Yde, J., & Nielsen, A. B. (1988). Epidemiological and traumatological analyses of injuries in a Danish volleyball club. *Ugeskr Laeger, 150,* 1022-1023.

Schafle MD, Requa RK, Patton WL, Garrick JG (1990) Injuries in the 1987 national amateur volleyball tournament. Am J Sports Med 18:624–631