

RESEARCH OF LOWER EXTREMITY INJURY AND RESOLVING IN NATIONAL FEMALE BASKETBALL PLAYERS

Xuezhen Liu

Biomechanics Department, Beijing Sports University, Beijing, China

KEY WORDS: feet pressure distribution

INTRODUCTION: Lower extremity injury is common for female basketball players. It seriously suffers training and competition. During body movement, the primary contact with environment is force from floor to feet, and then because of irregular movement of feet, the force will transmit upwards causing chronic injury of knee joint, hip joint and waist. In this experiment, by pressure distribution testing, we valued whether the indexes are common for feet pressure and varus and valgus of feet while walking and running. In this way, we give suggestion on training intensity and design of EVA insole for preventing injury.

METHODS: We took 14 female basketball players who were going to join Athens Olympics as subjects. Their feet pressure distribution of walking and running for bare feet were tested for 10 times. We used Footscan Flat of 0.5m, with frequency of 500Hz. Meanwhile, we took pictures of their feet and sport shoes with digital camera.

RESULTS AND DISCUSSION:

Discussion of feet varus and valgus curve and metatarsal pressure curve:

Table 1 Result of feet varus and valgus curve and metatarsal pressure curve.

	Over-valgus			Over-varus			Overpressure on 2 nd and 3 rd metatarsal		
	Walking	Running	Both	Walking	Running	Both	Walking	Running	Both
Players Number	9 64.3%	10 71.4%	6 42.9%	4 28.6%	7 50%	2 14.3%	12 85.7%	9 64.3%	9 64.3%
Double-Foot	4	7		2	2		7	3	
Single-Foot	5-right 5	3-right 3		2-left 2	5-left 4-right 1		5-left 3-right 2	6-left 5-right 1	

Diseases related to feet valgus injury: We found out that every player had over irregular movement or overpressure on middle part of forefoot during running or walking test. Especially Ren Lei, who both feet have over-varies, over-valgus and overpressure on 2nd and 3rd metatarsal in the running test.

What cause irregularly movement of feet are inborn and long time training. And improper sports shoes change normal movement as well. Take Hu Xiao-tao for example, her curve in test with shoes is higher than that without shoes. It shows that sports shoes cause her foreside of left foot over-varus increase. For inborn factors, it will cause injury and shorten the sport life of players without supervising and emendation.

Training intensity, training method and accidental injury will all change players' gait. During training period, we should supervise both varus or valgus and pressure changing of feet. As soon as testing curve developing to direction that leads to higher injury probability, we should adjust training in time, and take protection measures. Otherwise, once injury comes into being, it is difficult to recover.

Emendation of varus and valgus of feet and metatarsal overpressure: Sport shoes are the most important part of sports equipment. Choosing unsuitability will suffer training, even lead to injury. This experiment hopes to provide basis for feet injury prevention and how to choose shoes in future, and cooperate with the design of individuation insole. Based on Footscan design, Jempi, the famous Belgium biomechanics specialist and sports insole design specialist, made high quality 3D EVA insole for all the subjects. The insole is made up

of bottom, top and emendation parts. First, the bottom and top of different types and buffer capabilities were selected according to personal arch height and pressure. Then according to varus and valgus controlling needs, we chose different shapes of emendation parts. The result of the experiment will play an important role in training supervising and injury prevention.

CONCLUSION: Researching of lower extremity injury combined with feet pressure distribution is an available and exact method. In this article we analyses lower extremity injury of national female basketball players, and then found out injury causes according to the test of feet pressure distribution.

Designing individuation insole for female basketball players is based on the test result. It is very availability to emendate over-varus and over-valgus of feet and overpressure on metatarsal, and it should be spread energetically.