Treating Lateral Ankle Sprain in Basketball Players-A physiotherapists’ Prospective

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INTRODUCTION

Basketball is a team game and a non-contact sport. It is a fast moving and aggressive game which requires lot of vertical jumps and multidirectional activities [1]. Taylor, 2004 found out that on an average a basketball player performs 1050 ± 51 movements in a game out of which 46±12 are vertical jumps [2]. As the game includes lot of vertical jumps and multidirectional activities, the injury rate is quite high [3]. The injury rate is as high as 7.9 injuries per 1000 athlete exposures (AEs) in females and 7.1 injuries per 1000 AE in males [4]. Amongst all the injuries, ankle sprains are the most common. The incidence of ankle sprains is greater than 80% in basketball players because of the nature of the game [5]. More than 90% of elite athletes reported a history of at least one ankle injury in their athletic career [6]. The common mechanism of injury is excessive supination of the rear foot on an externally rotated lower leg soon after the initial contact of the rear foot during gait or landing from a jump [7]. Lateral ankle sprains are based on grades 1-3. Grade 1 is microscopic tearing of ATFL, grade 2- microscopic tearing of larger cross sectional portion of ATFL and grade 3- complete rupture of the ATFL [8].

As the injury rate and demands of the game are high, a rehabilitation programme should include exercises which will train the athlete as a whole and reduce the risk of further injuries.

Rehabilitation

Goals of rehabilitation [9]

- Reduce pain and swelling
- Increase pain free range.
- Increase strength.
- Improve joint proprioception
- Improve overall conditioning and endurance.
- Return to participation.
- Prevent recurrence

Reduce pain and inflammation- Immediate post-injury phase: (injury- 2 days)

In most cases of lateral ankle sprains, grade 1, 2 and 3, nonsurgical management plan has proven to be effective [10].

The best treatment for grade 1, 2 and 3 in the early stage rehabilitation or the acute stage is to follow the PRICE protocol i.e. protection, rest, ice, compression and elevation as there is swelling and pain at rest immediately after the injury. Application of ice and compression with crepe bandage within 36 hours of injury has found to limit the effusion and has been demonstrated to be effective in minimizing the amount of exudates [11]. For grade 1 and 2 gentle strengthening exercises and weight bearing with support should be started as early as possible [10]. Whereas, for grade 3 ankle sprains a more careful approach should be taken, if the athlete is unable to bear weight, the ankle should be put in functional walking orthosis and instructed to ambulate with crutches in a non weight bearing gait at least for 4 days [9].

For grade 1, 2 and 3- For grade 1 and 2 the rehabilitation protocol is generally faster than grade 3. For grade 3 lateral ankle sprains also mobilization should be started as soon as the pain permits [10].

Increase pain free range- Initial stage rehabilitation (2 – 5 days)

It is found that after ankle sprain, there is restriction of dorsiflexion which is very important during gait. Also there is excessive anterior displacement of talus which leads to laxity of anterior talo fibular ligament (ATFL). At least 10° of dorsiflexion is required for walking whereas 20° to 30° is required for running [12]. Mulligan (1993), reported rapid restoration of pain free dorsiflexion movement with mobilisation with movement (MWM) technique [13]. Weight-bearing treatment techniques are believed to be superior to non-weight-bearing techniques, as they replicate aspects of functional activities [14]. It is found from the previous studies that mobilisation produces more of a mechanical effect than a direct hypoalgesic effect. Hence to restore the dorsiflexion range MWM technique is used as it reduces any residual anterior displacement of talus [15]. Stretching exercises can also be given to improve the range of motion [10]. Strengthening exercises should also be incorporated to avoid muscle wasting [11].

Improve muscle strength and joint proprioception- Intermediate stage rehabilitation: (2- 6 weeks)

After an ankle sprain there is peroneal muscle weakness. Evertor muscles have suggested playing an important role in
preventing ligamentous injuries. The strength of the peroneus longus and brevis muscles is supposed to provide support to the lateral ligaments [9]. It has been hypothesised that, reduced evertor muscle strength would decrease the ability of evertors to resist inversion and hence will be unable to return the foot to a neutral position thus leading to an inversion ankle sprain [16]. Hence it is important to strengthen the muscles around the ankle joint to avoid chronic ankle instability which can lead to recurrent ankle sprains. Strengthening can be done with the use of elastic bands and tubes. Isokinetic strengthening should also be given as it has been found that the functional capacity of injured ankle reached as the same level of injured ankle [17]. Strengthening should be done both concentrically and eccentrically. Along with strengthening of ankle muscles, hip muscle strengthening is also important as deficiencies in hip muscle strength have shown to increase the risk of lateral ankle sprains [18].

There are proprioception deficits after an ankle sprain as there is trauma to the mechanoreceptors present in the ligament tissues which can lead to partial differentiation [19]. Mechanoreceptors are sensitive to joint pressure and tension caused by movement and static position. This disturbance of the afferent input from mechanoreceptors affects not only the sense of movement and position but also the subsequent proprioceptive reflex to control posture and coordination is affected, resulting in ankle sprains [20]. A sports specific balance training program like dribbling with 1 leg stance, dribbling while standing on wobble board, etc reduces proprioceptive deficits in lateral ankle sprains in basketball players [21]. Strengthening muscles can enhance proprioceptive abilities by stimulating the muscle spindle and golgi tendon organ receptors. The muscle spindles receive stimuli from static and dynamic gamma efferent nerves, and strength training increases the gamma efferent activity, thereby resulting in greater acuity in sensing joint position [17].

Return to sport- (4-6 weeks)

This phase should be more sport specific. Concentration should be on improving power, speed, agility and coordination as these are the components required for maximal strength levels in the shortest period of time in basketball. Plyometric exercises with weights or resistance have found to improve jumping skills in basketball players [22]. Jumping forward, backward, laterally; box drills, etc should be incorporated as these are effective methods for improving movement performance [9]. Plyometric exercises have shown to improve eccentric control of the muscles [23]. This improves stability of the joint while jumping thus supporting the joint while landing. Multidirectional sports specific exercises like catch and throw close to the body progressing to away from the body on a wobble board improves proprioception and co-ordination [9]. The athlete must be able to demonstrate proficiency in stopping, changing direction, jumping, and landing before returning to practice as all these skills are required for playing basketball. These exercises should be maintained throughout the season and also in off-season as they help in maintaining strength and improves proprioception thus, reducing the chances of recurrence. Also to avoid recurrence prevention strategies should be taken into consideration.

Prevention

Sastinopoulos D 2004 reported that ankle bracing reduced the incidence, severity, and long-term complications of ankle sprains, and thus resulted in less time lost from athletic performance [24]. Ankle taping has also been found to prevent injuries. It is also believed to improve proprioception [18]. But taping has been criticized of loosening and after one hour of physical activity taping offers no useful support as there is loss of 40% to 50% of original support. Hence semi rigid ankle support was found to be more effective as it helps in reloading and maintains anatomical alignment of the ankle. Shoes play an important role in prevention of ankle sprains as high top shoes provide an extra support in addition to taping or bracing [25].

Criteria for Returning To Sport [26]

Time should be given for tissue healing

• There should be pain free full range of motion.
• There should be no persistent swelling.
• There should be adequate muscle strength i.e. at least 90% of the contra lateral limb.
• Flexibility equal bilaterally.
• Joint stability is maintained by muscle control and/or a brace or tape.
• There should be good proprioception.
• Cardiovascular fitness should be equal to or better than the requirements of the game.
• Skills must have been regained.
• There should be no biomechanical dysfunction.
• The athlete should be ready psychologically.

CONCLUSION

While rehabilitating a player a holistic approach towards his/her injury is required. While considering this, the athlete’s capacity and requirement of the game should also be considered. A precise approach will benefit the athlete and help in early and complete recovery.

REFERENCES


