

Most common injuries in jump events in Athletics

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Abstract— Jump events in athletics, such as the long jump, high jump, triple jump, and pole vault, demand a combination of speed, power, and precision. These events put significant stress on the body, especially on the lower limbs, leading to a variety of injuries. The most common injuries in jump events include sprains, strains, fractures, and overuse injuries that affect muscles, ligaments, tendons, and bones. Proper training techniques, biomechanics, and injury-prevention strategies are crucial for minimizing injury risk in jump athletes. This paper examines the most common injuries in jump events, provides injury-prevention strategies, and discusses rehabilitation methods to facilitate recovery and prevent future injuries. The paper concludes by emphasizing the importance of injury management to optimize athletic performance and long-term career sustainability.

Index Terms— Athletics, Injuries, Jump, sprains, strain.

I. INTRODUCTION

Jumping events in athletics are some of the most dynamic and physically demanding competitions, requiring exceptional speed, strength, agility, and flexibility. Events such as the long jump, high jump, triple jump, and pole vault involve rapid take-offs, high-impact landings, and intricate movements that put a considerable strain on an athlete's body, particularly the lower limbs.

While the thrill of executing a perfect jump is a reward in itself, the repetitive nature and intense physical demands of these events make athletes susceptible to various injuries. The injuries in jump events can range from minor sprains and strains to more severe injuries, including fractures and ligament tears, often affecting the legs, knees, ankles, and lower back. The risk is heightened by improper technique, poor conditioning, and insufficient recovery.

Understanding the most common injuries in jump events, implementing effective injury prevention strategies, and utilizing appropriate rehabilitation techniques are essential for maintaining athlete health, performance, and career longevity. This paper aims to examine the most frequent injuries in jump events, ways to prevent them, and how athletes can rehabilitate from such injuries to return to peak performance.

2. Common Injuries in Jump Events:

I. Ankle Sprains:

- **Cause:** Ankle sprains are one of the most common injuries in jump events, particularly during landings. When an athlete lands awkwardly or with excessive force on an unstable surface, the ankle can roll, stretching or tearing the ligaments.
- **Symptoms:** Swelling, pain, bruising, and limited mobility.
- **Most Affected Jumps:** The long jump and triple jump, where landing mechanics and impact forces on the ankle are crucial. (Figure 1)



Figure 1 ankle-sprains-causes symptoms-and-treatment
(Source: <https://www.upandrunningpodiatry.com.au/>)

II. Patellar Tendonitis (Jumper's Knee):

- **Cause:** Overuse of the knee joint during repeated jumping and landing can lead to inflammation of the patellar tendon. This injury is particularly common among athletes who perform a lot of high-intensity jumps.
- **Symptoms:** Pain and tenderness below the kneecap, swelling, and difficulty with knee extension or flexion.
- **Most Affected Jumps:** The high jump and pole vault, which involve explosive take-offs and landings. (Figure 2)

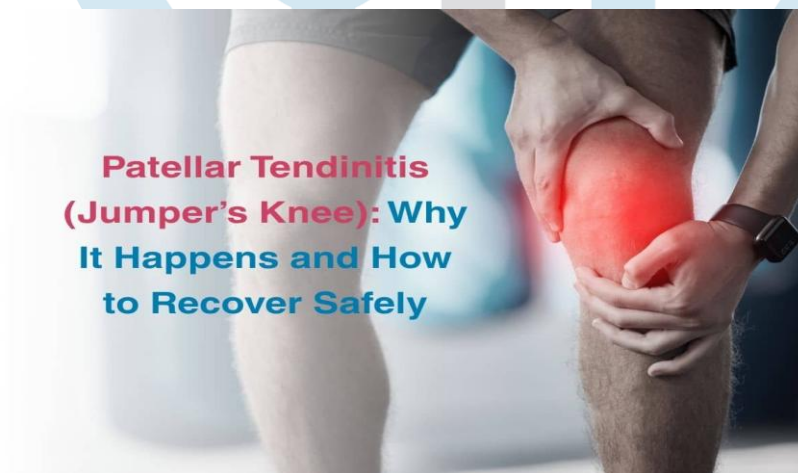


Figure 2 Patellar Tendinitis (Source: <https://share.google/O8cOOcKPzK8BVIHz8>)

III. Hamstring Strains:

- **Cause:** A hamstring strain occurs when the muscle fibers in the back of the thigh are overstretched or torn, often during the take-off phase or in the sprinting approach before a jump.
- **Symptoms:** Sudden sharp pain in the hamstring area, swelling, bruising, and difficulty moving the leg.
- **Most Affected Jumps:** The long jump, where the take-off speed and explosive power are key, and the triple jump, where repetitive force is exerted on the legs. (Figure 3)

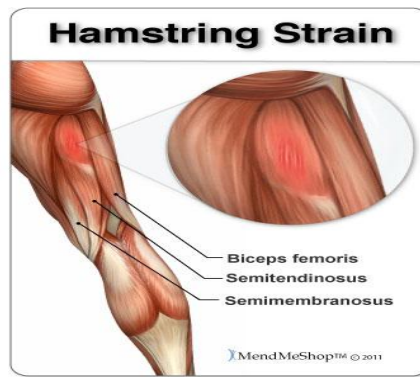


Figure 3 Hamstring Strain
(<https://share.google/1SMgeIHPXukBsVs9I>)

IV. Achilles Tendonitis:

- **Cause:** Repeated stress on the Achilles tendon during take-offs, landings, or sprinting can cause inflammation and irritation. This is especially common in high-impact jump events.
- **Symptoms:** Pain and stiffness in the Achilles tendon, particularly when running or jumping, and swelling around the tendon.

Most Affected Jumps: The long jump and triple jump, where the Achilles tendon bears much of the force during take-off. (Figure 4)



Figure 4 <https://share.google/WAsmzqt0MoUgvWjXv>

V. Stress Fractures:

- **Cause:** Stress fractures are small cracks in the bones that result from repetitive high-impact activities. In jump events, these fractures typically occur in the lower leg bones (tibia, fibula) and the feet.
- **Symptoms:** Pain that worsens with activity, swelling, and tenderness over the affected bone.
- **Most Affected Jumps:** The long jump and pole vault, where repetitive landing or take-off forces place significant stress on the bones of the legs and feet. (Figure 5)

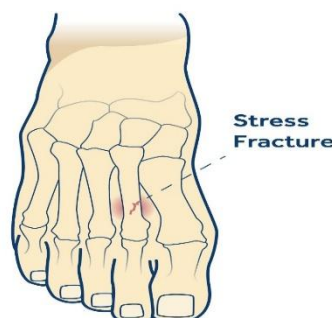


Figure 5 Stress Fracture
(<https://share.google/4omVVOhZrDJxGv8wb>)

VI. Groin Strains:

- **Cause:** Sudden, explosive movements in the take-off or landing phases can strain the groin muscles. The groin is particularly susceptible in the pole vault and high jump due to the significant flexibility required.
- **Symptoms:** Pain in the inner thigh, swelling, and difficulty in performing movements that require adducting the legs together.
- **Most Affected Jumps:** The high jump and pole vault, where movements demand great flexibility and power from the hip and groin muscles. (Figure 6)



Figure 6 Groin Strains (<https://share.google/HtSmDeihugH0Dxozb>)

3. Prevention of Injuries in Jump Events:

1. Proper Warm-Up and Flexibility:

- A proper warm-up helps prepare the muscles, ligaments, and tendons for the high-impact and explosive movements required in jump events. Flexibility exercises, including dynamic stretches, should focus on the hamstrings, quadriceps, calves, and lower back.
- Incorporating stretching routines to increase flexibility in the hip flexors, quads, hamstrings, and ankles can improve landing mechanics and reduce injury risk.

2. Strengthening and Conditioning:

- Jumping events require significant strength in the lower body, especially the glutes, quadriceps, calves, and core. Strengthening these muscle groups with targeted exercises (e.g., squats, lunges, calf raises, and plyometrics) can improve performance and reduce the risk of injury.
- Strengthening the stabilizer muscles around the ankle, knee, and hip joints can prevent overuse injuries like tendinitis and ligament strains.

3. Improved Jump Technique:

- A proper take-off and landing technique reduces unnecessary strain on the body. For example, ensuring correct knee alignment during take-off and avoiding over-rotation in the air can prevent injuries such as strains or sprains.
- Coaches should focus on form, and athletes should avoid rushing the approach to the jump. Practicing proper technique regularly helps reduce the impact on joints and muscles.

4. Adequate Footwear:

- Proper footwear designed for the specific jump event (e.g., long jump spikes, high jump shoes) provides better support, traction, and cushioning, which reduces the risk of injuries, especially to the ankles, knees, and lower back.
- Regularly replacing worn-out shoes is essential for preventing injury.

5. Recovery and Rest:

- Sufficient recovery time is critical to allow muscles, tendons, and joints to repair and adapt. Overtraining can increase the risk of overuse injuries, such as tendinitis or stress fractures.
- Incorporating rest days and using recovery methods like massage, stretching, and ice therapy can help keep the body in optimal condition.

4. Rehabilitation of Injuries in Jump Events:

1. Rest and Ice for Acute Injuries:

- For acute injuries like sprains, strains, or tendonitis, the first step is typically rest and ice to reduce swelling and inflammation. Elevation and compression may also be used to manage swelling.

2. Physical Therapy and Strengthening Exercises:

- Rehabilitation often involves physical therapy to restore range of motion and strength. For example, strengthening the muscles around a sprained ankle or recovering from a hamstring strain involves specific exercises targeting the injured area.
- Once the injury has healed, athletes engage in progressive exercises to rebuild strength, flexibility, and stability.

3. Gradual Return to Sport:

- After an injury, athletes should gradually return to jumping exercises, initially performing low-impact drills (e.g., bounding, light jogging) before progressing to full-intensity jump training.
- Monitoring pain and performance is crucial during this period to ensure that the athlete does not return to competition too soon.

4. Preventive Rehabilitation:

- After an injury, athletes should continue a preventive rehabilitation program to strengthen the injured area and avoid re-injury. This often involves a combination of flexibility, strengthening, and proprioception exercises.

5. Conclusion

Jump events in athletics place significant demands on an athlete's body, making injuries a common concern. Understanding the most common injuries in jump events, such as ankle sprains, patellar tendonitis, and stress fractures, is crucial for developing effective prevention strategies. Proper warm-ups, strengthening exercises, jump technique, and appropriate footwear all play an essential role in minimizing the risk of injury. Additionally, a structured rehabilitation program is vital for ensuring athletes recover fully and return to peak performance. By focusing on injury prevention, rehabilitation, and appropriate recovery strategies, athletes can enhance their performance while reducing the likelihood of setbacks due to injury. Maintaining a balance between hard training and injury management is key to ensuring long-term success in athletics.

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