Medical Practice in Lumbar Sports Injuries and Disorders

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Abstract: In Japan, sports medicine has developed significantly in conjunction with goals to improve athletic levels. Moreover, Japan has become an aging society where promoting health and preventing disease through sports have become commonplace. However, due to the participation by people of all ages in many sports activities, the occurrence of low back pain has increased. Low back pain is classified into several types, and the absence of adequate treatment will have a significant impact on prognosis. Therefore, early and adequate diagnosis of low back pain is very important. When low back pain is caused by sports, the specificity of each sport event should be noted. This paper describes the lumbar sport injuries and disorders such as sprains, fractures of the lumbar vertebrae, disc herniation, spondylolysis, and vertebral end-plate disorder during the growth period. In sports disorders, precise diagnosis and adequate treatment are necessary, and it is essential to avoid continuing treatment aimlessly when symptoms persist.

Key words: Low back pain; Sports injury; Sports disorder

Introduction

In Japan, sports medicine has developed markedly, in conjunction with the goal to improve athletic levels. Moreover, promoting health and preventing disease through sports activities have become commonplace in Japan’s aging society. Consequently, maintaining good health through rest, nourishment, and exercise is now assuming a dominant position in daily life, and the significance of sports has become increasingly recognized regardless of age and gender.

More than 60 percent of those who exercise experience low back pain due to damage (injury and disorder) caused by sports. It is important to note that low back pain frequently relapses when the sport is resumed, despite temporary improvement with regular medical treatment. In many clinical settings, it is difficult to provide treatment that allows the individual to return to the sport.
MEDICAL PRACTICE IN LUMBAR SPORTS INJURIES AND DISORDERS

This paper describes the sports injuries and disorders in the lumbar spine.

Diagnosis

Vertebral damage due to sports is broadly classified as traumatic, where a strong load is applied that forces the vertebrae to move out of the normal motion range, and the non-traumatic, where a repetitive load is applied to the vertebrae within the normal range of motion. Diagnosis and treatment of low back pain in athletes must be based on local findings and a medical interview to determine the age, onset condition, and background of the athletes (Table 1). In particular, low back pain and backache develop frequently in a wide range of ages, from adolescents in their growth period to the elderly, and they commonly lead to major problems when sports activities are continued. In order for athletes to resume their sports activities, it is necessary to provide treatment in conjunction with the performance level of each athlete. When symptoms persist or are exacerbated despite conservative treatment, physicians should consider surgical treatment (Table 2).

Lumbar Sports Injuries

1. Lumbar sprains

Lumbar sprains occur as a result of multiple motions including flexion, extension, and rotation such as a sudden twist of the lumbar spine. It results in a small tear (muscle strain) due to over-extension of soft tissues such as muscles and fascia, contusion of an intervertebral joint, or tearing of the interspinous ligament.

The symptoms include severe low back pain and difficulty with body movements in the acute phase and occasionally, local tenderness, purpura, and swelling.

X-rays often show no abnormalities, while in some cases, MRI (magnetic resonance imaging) reveals soft tissue injuries including muscles and fascia.
The treatment of lumbar sprains in the acute phase involves rest, medication with an anti-inflammatory analgesic, muscular relaxants, and icing. Treatment in the chronic phase involves enhancing muscle strength and stretching in the abdomen and back.

2. Lumbar vertebrae fracture

Lumbar vertebrae fractures are caused by a direct force or sudden muscle contraction and are commonly accompanied by major soft tissue damage. The fracture sites are the vertebral arch, spinous process, transverse process, and the vertebral body. Imaging with plain X-rays or a CT (computed tomography) scan is useful for diagnosis. Recently, compression fractures of the vertebral body have been increasing, due to air sports such as hang gliding. Treatment and prognosis depend on the degree of fracture and the presence of complications.

Symptoms include severe pain (spontaneous or during exercise) in the lower back and difficulty with body movement in the acute phase as well as local bruising, swelling, and occasionally, spinal deformation and neuroparalysis. Therefore, it is essential to check neurological findings (presence of perception, motion, reflex, bladder and rectal disturbance).

Treatment during the acute phase includes rest, medication, and fixation (with plaster and corset). When a burst fracture, dislocation fracture or neuroparalysis is present, surgical treatment is carried out.

3. Lumbar disk herniation

Lumbar disk herniation in athletes is caused by acute or chronic external force. The symptoms frequently relapse even if they are temporarily relieved after conservative treatment, and therefore, it is important to carefully select the treatment. This condition commonly occurs in athletes involved in sports such as baseball, basketball, volleyball, rugby, athletics, table tennis, boat racing, and judo.

The symptoms include pain in the lower back and lower limbs, limited movement of the trunk and in the lower limbs. In patients with limited movement in the lower limbs, careful treatment and follow-up examinations are necessary. As a supplemental diagnosis, plain X-rays, CT, MRI, and myelography are used. In particular, MRI provides extensive data including the type of disk herniation.

The principal treatment during the acute phase includes rest and medication with an anti-inflammatory analgesic and muscular relaxants. Additionally, thermotherapy, traction therapy, exercise therapy, and epidural nerve block are used. When conservative treatment is ineffective, and the symptoms persist and are exacerbated, surgical treatment is recommended. If the opportunity for performing surgery is missed, recovery from paralysis may be difficult. Returning to the sport activity requires systematic athletic rehabilitation.

Lumbar Sports Disorders

1. Spondylolysis

Lumbar spondylolysis commonly occurs as a stress fracture in the growth period when bones are immature. However, top-ranked adult athletes may develop spondylolysis or spondylolisthesis. This condition occurs due to single or multiple movements including hyperflexion, hyperextension, and rotation of the trunk. Treatment activities that are frequently associated with this condition are baseball, sumo wrestling, judo, athletics, and gymnastics.

The symptoms include low back pain and indefinite complaints of the lower limb (pain, numbness, and weakness), which appear when exercising. For diagnosis, an oblique view of a plain X-ray is useful, and the CT and MRI are invaluable diagnostic tools.

Although conservative treatments can relieve the symptoms in most cases, surgical treatment is recommended for patients who have no remission or repetitive low back pain. Bone union can probably be achieved with conservative treatment using a corset, when early X-rays show the type of crack that has been
sustained. However, it is difficult to achieve bone union in the case of pseudoarthrosis.

2. So-called “low back pain”
The so-called low back pain is mainly a low back pain symptom that is not accompanied by abnormal X-ray findings or symptoms in the lower limbs. Acute and chronic stress causes inflammation in the muscles, ligaments, and fascia, secondary reflex muscle spasms, chronic muscle fatigue, and disturbed blood flow. There is a high incidence of this condition in both athletes and exercisers.5)

3. Disorder of the vertebral end-plate during the growth period
The vertebral body in adolescents during their growth period has a ring apophysis unlike that of adults, resulting in the fusion of the secondary ossification center in the 20–29 age range. Igata, et al., classified this disorder into three stages — the early stage (radiolucent lesion), the advanced stage (isolated and segmented lesion), and the end stage (dissecting lesion). The changes in the end stage are marginal separation of the vertebral body in the anterior area, posterior chamber angle separation in the posterior area, and diffuse type and local type separation in the middle area.9) The sports that are associated with this condition are the same sports that cause lumbar disk herniation.

In some patients, this condition starts with severe low back pain, and body movement becomes difficult in the acute phase. However, in other patients, it frequently becomes chronic. Imaging examination is necessary for diagnosis, but there is a need to differentiate it from spondylolysis in some cases. Conservative treatment is primarily used.

Conclusion
Recently, in Japan, a variety of sports intended to improve athletic levels and health have become commonplace for school age children to middle-aged or elderly adults. Simultaneously, the number of sports injuries has increased.

Precise diagnosis and adequate treatment are necessary for sports injuries and disorders. When symptoms persist, it is essential to avoid continuing treatment aimlessly.

REFERENCES