

REHABILITATION OF SPORTS INJURIES



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Introduction

Rehabilitation is a generic term for the comprehensive treatment of injury. It has active and passive elements. It focuses upon the whole person not just the injury and aims to restore the greatest possible degree of function in the shortest possible time. Three concepts help with the understanding of the rehabilitation process these are impairment, disability and handicap. Injury causes an individual an impairment. This is the injury at the tissue level e.g. ruptured medial collateral ligament of the knee. Impairment usually causes a disability This is a loss of function e.g. walking with a limp and unable to run. This in turn may cause a handicap this is an individuals inability to perform tasks or engage in activities. e.g. the professional footballer is unable to compete for the rest of the season due to the knee injury which causes loss of playing time, reducing his income and prematurely ending his career. This causes some reactive depression. From this example the need for the physician to consider the medical, physical, psychosocial, vocational and leisure requirements of the injured athlete is apparent. The areas covered are:- principles of rehabilitation, treatment modalities, specific examples, complications of inadequate or incorrect rehabilitation, & prevention.

Key concepts Team Approach : Rehabilitation is facilitated by a team approach. The basic team comprises of injured athlete, physical therapist (physiotherapist), sports doctor and others are orthotist, brace maker, strapper, coach, exercise trainers, dietitian, psychologist, dentist, nurse, first aid personal, peer group, family and friends. **See Table No.1**

Acute injury management : Begins immediately and can be performed by the athlete or any other capable person. This phase lasts the first 24-48 hours. It consists of protecting the individual from further harm, resting, and icing the injury. Compression and elevation are used to minimize edema and haemorrhage and drugs are used for analgesia, anti-inflammatory properties and muscle spasm relief. Acute injury management is summarized by the

acronym PRICE (Protection, rest, ice, compress & elevate). Occasionally more extensive treatment or surgery is required. **See Table No.2**

Drugs : In general the authors feel that drug use should be minimized and the other components of injury management emphasized. Drugs used in rehabilitation of sports injuries are of four main groups. **Analgesics** - paracetamol, codeine, opiates and local anesthetic agents; **Anti-inflammatory medications** are used extensively and have analgesic properties as well as causing moderation of the inflammatory response to injury. A short course of 3-7 days can be useful. Compliance is better with once or twice daily dosing; **Anti spasmotics and sedatives** are utilized to reduce muscle spasm and consequent pain, stiffness and immobility in the first 48 hours. They also induce drowsiness and can aid sleep i. e. Benzodiazepams (Goodman and Gillman, 1990). ; **Corticosteroids** are usually used in chronic injuries. They have anti inflammatory, immunological and metabolic effects. They are injected intra-articularly or into connective tissue around tendons e.g. in subacromial bursitis.

Management 1. Passive physical treatments:

Ice, heat, ultrasound (used alone or in combination), T.E.N.S., laser, & manual therapy are the passive physical treatments to manage the injured athlete. Ice has beneficial effects in the acute and intermediate phases (Hillman and Delforge, 1995). Cold decreases spasm and slows nociceptor nerve conduction. Once swelling and pain have diminished sufficiently, ice is combined with active and passive range of motion within pain tolerance. The ice is used both prior to and during the therapeutic exercise session. This is done for 20-30 minutes twice a day. In between the injury site is protected. Induce analgesia with ice for 20 minutes, exercise (static stretch, isometric contract, static stretch), rest 30 seconds and repeat (2-3 times) several times per day. Once the effects of swelling and pain have subsided and the athlete has progressed to more vigorous exercise and functional activity, the ice is used for 20-30 minutes after the therapeutic exercise bout. Ice can cause burns and

superficial nerve palsies (peroneal and ulnar). Caution should be exercised with Gel packs which freeze below 0 Centigrade. These should be wrapped in toweling. Heat causes vasodilatation (increased delivery oxygen, nutrients and immune mediators) and increased metabolic rate, altered pain sensation, increased collagen extensibility, better nutrition and decreased sensitivity to muscle stretch (Lehmann,1984). Acute use helps relieve muscle spasm. Most useful for chronic inflammation, joint stiffness, pain syndromes. May cause increased edema and local burns and should be supervised by the physical therapist. Modern use of heat relies on hot packs 40-70 degrees applied for 20 minutes in conjunction with range of motion exercises. The widespread use of rubifacents to cause peripheral vasodilatation and local heating is not recommended due to the relative difficulty in controlling timing and dosage. Ultrasound High frequency soundwaves 0.8- 1.1MHz, produce heating at fascial planes. When pulsed at low frequency ultra sound produces a mechanical effect. Together they produce an analgesic and anti-inflammatory effect by increasing local perfusion and metabolism (Kulund,1988'). Thrombolysis is aided and there is a role in haematoma treatment (Luo et al.,1996). There are complications of overzealous or incorrect treatment. Usually employed after the acute phase.(Falconer et al.,1990) TENS (Transcutaneous electric nerve stimulation) produces analgesia and is used extensively in chronic pain syndromes (Wall and Melzeck,1989). Indifferent is a form of TENS in which alternating electrical stimulation is used to produce various levels of muscle contraction. This reduces the edema and helps minimize disuse atrophy. There is some evidence that it has antispasmodic action in spinal injury patients(Goulet et al.,1996). Cold laser is used for small localized lesions (e.g. long head biceps strain) It is claimed to reduce pain and spasm and have beneficial effects on local metabolism. Evidence exists for alteration of nerve conduction(Baxter et al.,1994)but is absent for clinical effect in well controlled in vivo studies (Mokhtar et al., 1995).Manual therapy: Manual therapy encompasses all forms of massage, mobilization, manipulation, traction and neural stretching. The ultimate manual treatment consists of surgery. The individual techniques and combinations are applied in different way. Manual therapy is the most ancient form of medicine the 'laying on of hands' Several practitioner groups make claims that are unscientific and misleading. The authors recommend that athletes be guided to therapists who have scientific training,

experience in sports injury and who can work in a team. There are potential risks with manual therapy, particularly rotational spinal manipulation which has caused disc prolapse, corda equine lesions and vertebral artery dissection (Padua et al & Assendelft et al.,1996). There are clear benefits in reduction in muscle spasm and edema, relaxation, flexibility and increased joint range of motion from manual therapy. There is also a placebo effect in some patients. Psychological benefits of manual therapy are often observed.

2. Active physical treatments:

Active physical treatment is the foundation of the rehabilitation process. When an injury occurs immobile muscle rapidly atrophies, connective tissue contracts and detrimental joint changes occur. Active physical treatment requires the interest and compliance of the athlete to minimize injury consequences and return to activity.

(a) Strengthening exercises:

These aim initially to minimize disuse atrophy, increase circulation and maintain muscle condition. As healing continues gains in strength, control, co-ordination and endurance facilitate recovery. There are several types of strengthening exercises and these are combined for maximum effect. It compromised the Isometric exercises are conducted without movement across the joint on which the muscle acts, Isotonic muscle contraction moves a joint through a range of motion, Daily progressive resistance exercise (P.R.E.) using weights or other resistant devices is prescribed and begins after the acute phase, A variety of machines have been designed to improve strengthening throughout the joint range for different muscle lengths, & plyometric exercises are also useful in developing muscle power

(b) Flexibility:

Flexibility exercises have two benefits. First in allowing and encouraging joint ROM exercises, they are a factor in return of normal joint mechanics. Second the effect of graduated. Stretching over time increases the length of contractile units and connective tissue elements within the muscle. Flexibility exercises have the effect of improving the efficient range of muscle contraction and preventing avulsion at tendon bone junction by reducing the chance of end range 'bow stringing'. Proprioceptive Neuromuscular Facilitation Stretching (PNF) reduces muscle tone by stimulating the Golgi tendon organs.

(c) Endurance

Endurance refers to the ability of a muscle to perform a static (isometric) or dynamic (isotonic) task. It depends on the state of the individual muscle and the cardiovascular status of the individual. A guide to

endurance can be made by using physical work capacity measures, or pulse verses workload. Many methods are available to provide aerobic and endurance training for the injured athlete. They includes Swimming, Water exercises(hydrotherapy), Brisk walking, Circuit training, Calisthenics/Aerobics, Stationary bicycles, & Machines (stepper, rowing, arm crank etc).

(d) Proprioceptive retraining

The goal of proprioceptive exercises is to reduce the time between neural stimuli and muscular response, thus reducing the stress on the injured joint during functional activities. Rehabilitation of injuries to the knee and ankle require proprioceptive retraining.

(e) Functional training

Muscle groups are exercised in tandem allowing coordinated purposeful movement. Specific weakness patterns and technique errors can be addressed. These exercises may begin with partial squats, leg presses, step-ups, lunges, or closed-chain terminal knee extension.. For Example, a basketball player with a knee injury could perform a compound exercise such as a set of body weight squats, when pain free. This could progress with increased weights and gradual introduction of standing jumping exercises. This could be enhanced with a plyometric program of exercises.

3. Psychological :

Research suggests that athletes respond to injury

Table 1

Diagnosis	
1. History	present injury, past, athletic, social, family and psychological histories where required.
2. Examination	including measurement of impairment and function, comparison with unaffected limb and review of biomechanical factors.
3. Investigation	may include specific functional tests, pathology, radiology and nuclear medicine investigations where appropriate
4. Problem List	particularly if the injury is complex or severe.

Table 2

Protection	is to prevent further injury and may involve the use of tape, padding or external supports
Rest	is relative; the injured body part is 'rested' while the unaffected parts are exercised. Rest should not mean inactivity.
Ice	20 minutes every 2-4 hours while the patient is awake for first 48-72 hours.
Compress	Bandage, tape or brace for majority of acute period
Elevate	affected limb for 1-2 hour periods during the day a pillow under an injured limb at night

REFERENCE

Assendelft et al Complications of spinal manipulation: a comprehensive review of the literature J Fam Pract 1996 May 42(5) 475-80. **Baxter et al** Effects of low intensity infrared laser irradiation upon conduction in the human median nerve in vivo Exp. Physiol 1994 March 79(2) 227-34. **Falconer et al** Therapeutic ultrasound in the treatment of musculoskeletal conditions Arthrit Car Res 1990 June 3(2) 85-91. **Goodman and Gillman** The Pharmacological Basis of Therapeutics 8th Ed Pergamon Press 1990 **Goulet et al** Effects of transcutaneous electrical nerve stimulation on H reflex and spinal spasticity Scand J Rehab Med 1996 Sep 28(3) 169-176. **Hillman and Delforge** The use of Physical Agents in the Rehabilitation of Athletic Injuries Clinics in Sports medicine 4/3 July 1985. **Kulund** 'The Injured Athlete' Lippincott 1988. **Lehmann J** Therapeutic Heat and Cold 3rd Ed. Williams and Wilkins 1984. **Luo et al** Transcutaneous ultrasound augments lysis of arterial thrombosis in vivo Circulation 1996 Aug 15 94(4) 775-8. **Mokhtar et al** Double blind placebo controlled investigation of the effect of combined phototherapy/low intensity laser therapy upon experimental ischaemic pain in humans Lasers Surg Med 1995 17(1) 74-81.

with mood disturbance and lowered self-esteem. Calm explanation of the diagnosis, education and involvement in the rehabilitation plan are important parts of the therapeutic relationship.

4. Biomechanical factors:

Understanding the mechanism of the injury will help modify the activity to prevent re-injury. If this is not corrected adaptive protective behavior may lead to a second and apparently unrelated injury. Biomechanical factors can be assessed by attending the events and being involved as team doctor. A detailed history and examination of the athlete is essential.

5. Return to sport:

Guidelines for return to sport after injury: 1. Acute signs and symptoms have passed. 2. Full functional use of all joints, adequate strength and proprioception to perform tasks. 3. Normal mechanics of movement. 4. Successful performance of sport specific activities at or above pre-injury level should be documented.

Prevention General principles:

1. Adequate training and preparation prior to competition(weeks/months). 2. Consider body physiognomy, maturity and experience to compete. 'Profiling' is a concept that matches an individuals physiognomy with the type of sport and in team sports to their role. 3. Sports facility factors. Such as state of competition area, equipment maintenance, injury treatment equipment and air pollution. 4. Rules and aims of sporting contest.