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MEDICINA DE L'ESPORT

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SPECIAL ARTICLE

Return to competition following athletic injury: Sports rehabilitation as a whole

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Received 23 December 2009; accepted 12 January 2010

KEYWORDS

Athletic injury;
Sports rehabilitation

PALABRAS CLAVE

Lesión de atletismo;
Rehabilitación
deportiva

Abstract

An injury has a multifactorial nature and produces tissue damage, resulting in clinical symptoms and different degrees of immobilization and rest that affects the performance capacity of the athlete as a whole person. Therefore each injury needs to be viewed in the setting of the entire athlete, so functional recovery after injury may be considered a multivariate psycho-biological phenomenon involving the whole injured athlete.

The safe return to competitions after injury is a process that must involve the injured athlete as a whole person, where the rehabilitation team must work together to consider the biological, neuro-mechanical, metabolic and psycho-sociological aspects of the rehabilitation, with particular emphasis on the end phases of the functional recovery that must be performed on the field.

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Vuelta a la competición tras una lesión atlética: la rehabilitación deportiva global

Resumen

Una lesión es de naturaleza multifactorial y produce daños en los tejidos, dando lugar a síntomas clínicos y distintos grados de inmovilización y reposo que afectan a la capacidad de rendimiento del atleta como un todo. Por lo tanto, cada lesión tiene que estudiarse en el entorno global del atleta, así que la recuperación funcional después de la lesión puede ser considerada como un fenómeno psicobiológico multivariado, incluyendo al atleta lesionado.

El regreso a las competiciones de forma segura después de la lesión es un proceso que debe involucrar al atleta lesionado como un todo, donde los miembros del equipo de

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doi:10.1016/j.apunts.2010.01.003

Please cite this article as: Roi GS. Return to competition following athletic injury: Sports rehabilitation as a whole. Apunts Med Esport. 2010. doi:10.1016/j.apunts.2010.01.003

rehabilitación deben trabajar juntos para estudiar los aspectos biológicos, neuromecánicos, metabólicos y psicosociológicos de la rehabilitación, con especial énfasis en las fases finales de la recuperación funcional, que debe realizarse en el campo.

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Introduction

There is wide agreement that a proper rehabilitation program is crucial to attain the functional recovery after sports injuries. Many protocols are being proposed for restoring the optimal form (anatomy) and function (physiology) of the injured athlete,¹ most of them focusing on several aspects of the functional outcomes.

From an anatomical point of view it must be considered not only which surgical or conservative techniques may be best suited for accomplishing the anatomical restoration or reconstruction of the injured tissues, but also on how these techniques affect the final goal of reaching the best functional outcome of the patient.²⁻⁴

From a functional point of view several criteria influencing the safe return to sport have been proposed for many pathologies. For instance, Joanna Kvist in her paper⁵ on rehabilitation following Anterior Cruciate Ligament (ACL) injury, proposed that static and functional stability of the knee, no pain or effusion, full range of motion (ROM), muscle strength and performance are the criteria that must be fulfilled before letting the patients return to sport. These criteria must be fulfilled either by surgery and/or rehabilitation interventions, but it is also necessary to add "other factors" like psychological and sociological ones, depending on the adopted model of performance.⁶

Also the Consensus Statement of the American College of Sports Medicine⁷ stated that essential for rehabilitation of athletes is to provide sport specific assessment and training to serve as a basis for sport specific conditioning. Previous successful experiences in single cases of accelerated rehabilitation emphasized the importance of a sport specific functional rehabilitation starting from the early phases of the rehabilitation. For instance, our group published the case history of an elite soccer player,⁸ and Tyler et al. that of an Olympic ice hockey female player.⁹ In both these cases return to sport was fast and very successful in terms of sport performance.

The injured athlete as a whole

An injury has a multifactorial nature¹⁰ and produces tissue damage resulting in clinical symptoms and different degrees of immobilization and rest, affecting the performance capacity of the athlete as a whole. Therefore each injury needs to be viewed in the setting of the entire athlete, not just the local area of acute tissue damage.¹¹ Furthermore not only the injured athletes, but all patients want to be treated as ill person and not just as injured knee or ankle. Therefore, functional recovery after injury may be considered a multivariate psycho-biological phenomenon involving the whole athlete.⁶

As a result, each athlete and consequently each person must be considered as a mind-body unity.¹² An injury affects the union between mind and body and interrupts the normal flow of life because an injury alters the execution of movements in both cognitive and emotional aspects. So the main goal of rehabilitation is to reconstruct the lost flow of life, and the emotions connected to specific sport patterns should be recovered as well.¹³

For this reason, we adopt a specific vision of treatment with a goal oriented pathway, that involve biological, neuromechanical, metabolic and psychological aspects, soundly based on scientific evidence.

The goal oriented pathway

From a clinical and rehabilitation point of view, we subdivide the rehabilitation period after sports injury into four stages (Fig. 1) that represent a progressive continuum of therapeutic management,¹⁴ according to the four typical questions the patients ask after injury: "When will I be able: 1) to walk normally? 2) to run normally? 3) to start training on the field? 4) to go back to competitions?". This strategy underlines one of the main themes of sports rehabilitation, that objective criteria, rather than specific timetables should guide clinical decision-making.

So the safety of the rehabilitation program is assured by a goal oriented pathway with protocols based on recovery of a full range of motion, strength, and sport specific skills without pain, swelling or effusion. These clinical signs are indicative of the delicate balance required to promote tissue healing without overstressing the repair tissue and together with functional criteria must be always considered for load progression. This pathway must be under the supervision of a proper sports rehabilitation team that utilizes all the skills offered by the members of the team¹⁵ within a multidisciplinary approach.

In the adopted rehabilitation pathway professional athletes may proceed faster than non-athletes because they usually perform more weekly rehabilitation sessions, but the time to attain a specific rehabilitation goal is always a result of the type of injury, the surgical technique, the rehabilitation protocols, and the capacity to attain the best functional recovery by the patient itself.

The places of the rehabilitation

The injured athletes start in the rehabilitation program as early as possible with gym and pool sessions, with specific interventions addressing pain, swelling, ROM, proprioception, strength and aerobic fitness according to well known protocols.

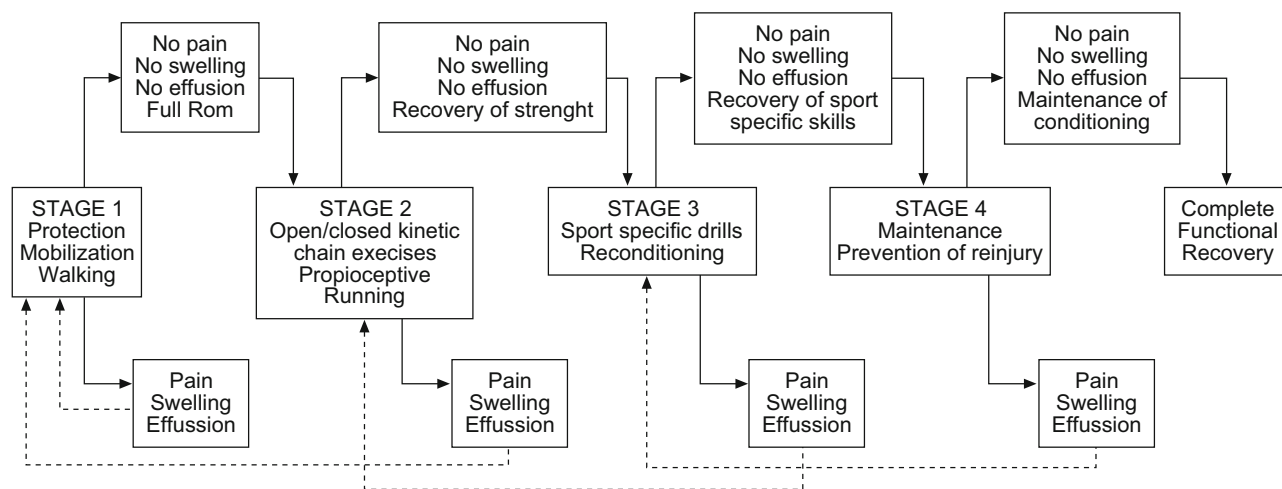


Figure 1 In the goal oriented rehabilitation pathway the transition from one stage to the next is allowed when the goals of the stage are attained without pain, swelling and/or intra- or extra-articular effusion. If the patient experiences one or more of these symptoms the rehabilitation goes back to the previous stage (dotted lines).

Sport-specific patterns are introduced early, mainly in the pool (i.e. heading drills for soccer players), but also in the gym, when possible. These patterns are designed to facilitate sport-specific neuromuscular skills, because when the patient walks in water punting a ball thrown by the therapist it will achieve completely different results than having the patient simply walk in the water. This approach not only stimulates the musculo-skeletal system but it also stimulates neuroplasticity,¹⁶ properly preparing the patient for the subsequent phases of the rehabilitation.^{17,18}

During the first phases of the rehabilitation performed in pool and gym, the attention of the rehabilitation team is usually very high, and it must remain high when the patient returns to his or her first runs on the field. At this time the risk of complications and relapses is very high and the athlete may return to his team with an incomplete neuromuscular recovery.¹⁹ Therefore, the final phases of the rehabilitation preceding the return to sport must be performed on a specialized rehabilitation field (on-field rehabilitation: OFR), under control of OFR specialists.

During OFR the injured athlete is considered as a whole person with a multi-disciplinary approach aimed to obtain the best possible functional recovery.

The criteria for starting OFR are a good joint stability in clinical tests, no giving-way episodes during the preceding phases, minimal or no pain (VAS less than 3/10), minimal effusion (grade 0 or 0/1+), complete ROM and maximal peak torque difference less than 20% between limbs in isokinetic tests. Patients must also be able to run on the treadmill at 8 km/h for more than ten minutes.

Each OFR session takes place outdoors on a grass or synthetic field or indoors on a synthetic field and is integrated by gym sessions where massage, flexibility and specific strengthening exercises are performed.

During OFR the progression of each type of exercise is sport specific and follows the principles of strength training and of increased functional demand²⁰ performed on progressively broader spaces with respect to the musculo-skeletal and neuromechanical components involved in the recovery process.

A unique aspect of the rehabilitation as a whole is the attention to the overall fitness level of the injured athlete, which at the end of the rehabilitation should be compatible to the competitions. Incremental tests are performed for assessing the aerobic and anaerobic thresholds after that the metabolic intensity of OFR is constantly monitored with heart rate monitors and progressively increases²¹ up to that typical of competitions.

Conclusion

Sports rehabilitation must be considered a multivariate psycho-biological phenomenon. The safe return to competitions following an athletic injury is a process that must involve the injured athlete as a whole, in which the rehabilitation team must consider together the biological, neuro-mechanical, metabolic and psycho-sociological aspects of the rehabilitation, with particular emphasis on the ending phases of the functional recovery.

Conflict of interest

The authors declare that they have no conflicts of interest.

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