RETURN TO PLAY PROCESS FOR HAMSTRING INJURIES

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HAMSTRUNG BY INJURY

"Pulling a hammy." An injury that is as common as it is infamous. One of the most well-known hamstring injuries in modern sports history, proving that no one is immune to this injury, was suffered by Derek Redmond. The British sprinter and 400 m record holder competed in the semi-finals of that race in the 1992 Summer Olympic Games. With a strong start, Redmond raced down the back stretch then abruptly collapsed at 150 m. In a demonstration of defiance, he stood up and hobbled on his left leg toward the finish line, waving off medical attention. On the final stretch, his father Jim emerged from the stands to help carry his son to the finish line. Injuries would ultimately force Derek Redmond to retire from track and field, but his return to play story did not end there. Later, Redmond went on to play professional basketball and earned a place on the Great Britain national basketball team. He followed up his basketball endeavours by successfully playing competitive rugby union in Great Britain – all going to show that hamstring injuries need not end sporting careers!

Many athletes have suffered from a hamstring injury; it impacts professional, amateur and recreational athletes alike. Hamstring muscle strains are the most common of all muscle strains. No matter what you call it – a strain, a pull, a tweak or a tear – even a mild injury can cause a delay in returning to sport or even lead to a change in the type of sporting activity you are able to do. Prognosis following hamstring muscle injuries will vary from injury to injury and person to person, with a myriad of factors contributing to the duration of time required to return to sport. It is this complexity that makes determining an appropriate time to return to play so difficult. While not all factors will be explored here, those that contribute to the return-to-play (RTP) decision are as important as making the right diagnosis or ordering the best imaging exam. This article considers that process of deciding when an athlete can return to play after a hamstring strain injury.

Figure 1: Decision-based return to play (RTP) model. The decision-based RTP model for an injury or illness is specific to the individual practitioner making the RTP decision. The large circles represent the states of nature elements (the circumstances under which a decision is made). The RTP square represents the final decision that actually results in an action being taken. The texts on the far right are individual factors or components identified from the literature that contribute information to the states of nature. These factors are grouped into medical factors, sport risk modifiers and decision modifiers and are on the left because they represent the general concepts the clinician should focus on when making a decision (the details are provided on the right).

In Step 1, the health status of the athlete is assessed through the evaluation of Medical Factors. For example, symptoms, signs and testing provide information on how much healing of the injury or illness has occurred.

In Step 2, the clinician evaluates the risk associated with participation. For example, the health status is usually heavily weighted when the known re-injury and long-term sequelae risks are high (e.g. if an athlete participates with only partial healing). However, there are sport risk modifiers that also affect the risk associated with participation. For example, it may be possible to protect the injury with padding or to minimise risk by changing the position of the player. Although the RTP decision is fundamentally based on the risk associated with participation, decision making in all fields is based on a risk-benefit balance. There may be benefits to an athlete that affect what is considered an acceptable risk. For example, play-off competitions may result in significant financial and non-financial gains.

Accounting for these decision modifiers (Step 3) is the final step in the process that leads to the actual RTP decision. Decision modification is set aside from the other steps because participation risk does not contribute information about decision modification and decision modification cannot be used to determine RTP except in the context of participation risk. Finally, the process is recursive; decisions to not clear an athlete for participation are revisited as the healing process continues and decisions that allowed an athlete to play are revisited if symptoms or signs recur or if the statuses of any of the sport risk modifiers or decision modifiers are changed. (Republished with permission of Clinical Journal of Sports Medicine)

> ***The role of the coach and the setting in RTP decisions cannot be over-emphasised***

RETURN TO PLAY DECISION MAKING: BEYOND 'CLEARED VS NOT CLEARED'

Currently, there are no consensus guidelines or criteria for safe return to activity following hamstring muscle strains that maximise performance and minimise the risk for injury recurrence. Re-injury and prolonged rehabilitation are common with hamstring injuries, and therefore it is of upmost importance to be able to understand the milestones that need to be achieved in order to successfully return to play. On one hand, the RTP decision is often heavily influenced by clinical findings such as injury location and size, strength lost and regained and pain-free range of motion. On the other hand, there are factors that are equally as valuable to the RTP process, but are often neglected in texts on the topic.

Athletes and physicians are as diverse as their opinions regarding injury and treatment, which may lead to disagreement on medical decision-making and RTP. Physicians, athletes, coaches, physiotherapists, agents and other stakeholders all have individual perspectives regarding injury and sport participation based on their background, experiences and other socio-cultural influences. It is therefore easy to understand why RTP decisions are so difficult and why prognosticating return is so complicated. A standardised structure and approach to RTP decisions has the potential to reduce conflicts and decrease subjectivity.

Evaluation of health and participation risks

In 2010, we proposed a three-step decision-based model to provide clinicians with a structure for making these decisions (Figure 1). In Steps 1 and 2, the model emphasises the assessment of an athlete's risk of returning to sport, based both on their health status and their specific risk for injury or re-injury by participating in the identified activity. The medical history, physical exam findings, laboratory results, diagnostic imaging findings and consultant recommendations comprise the evaluation of health status. An astute clinician has to be able to determine when reasonable healing has occurred, as re-injury risk significantly increases when the affected location is weaker or less functional than it was prior to injury. In addition, the psychological state of the athlete should be assessed and considered during the health evaluation to ensure that any necessary therapy or intervention is not delayed. For the hamstring injury, these medical factors are considered elsewhere in this journal.

Evaluation of participation risk in the process of deciding on RTP for athletes is critical. Firstly, high risk sports such as football, sprinting and water-skiing lend themselves to a delayed RTP due to the high incidence of re-injury. By contrast, sports such as lawn bowls (which admittedly require high degrees of hip flexion) may not raise the same level of anxiety in either the clinician or patient! Secondly, position or role in the sport is important. RTP from a hamstring strain in a goal keeper compared to a striker in football may be facilitated, due to the reduced sprinting demand and the ability to transfer kicking responsibilities. A throwing athlete in athletics may potentially have a hastened RTP compared to a 100 m sprinter, and a 400 m sprinter may have a hastened RTP compared to a 100 m sprinter. Specific demands of the sport are clearly important. Thirdly, if an athlete is lucky or unlucky enough to have an injury in their non-dominant leg, they may be able to RTP expeditiously, compared to the same injury occurring in the dominant leg – distinct demands on the limbs must be taken into account no matter what the position or the sport. Additionally, it is well-recognised that the demands of elite level sport, in all codes, are greater than that of recreational level sport. While the bodies of elite athletes are typically accustomed to those loads, it may take a longer period of time for the hamstring to regain the high level of function required to play and compete at the highest level – as we will see, Step 3 may place contrasting demands on the elite level athlete! Finally, in this brief overview of risk modifiers, one must consider the ability to protect the injury. With a hamstring injury, typically of non-contact aetiology, this remains extremely limited, and so may not play a significant role in the decision-making process.

Decision modification

Step 3 of the RTP decision involves decision modifiers, which are those factors that may change the decision that would have been made, had risk evaluation been the only consideration of the RTP decision. It is the responsibility of the clinician to appropriately inform an athlete of the benefits, harms and alternatives associated with medical decisions, as well as to determine what is an acceptable level of risk.

DECISION MODIFYIERS IN RTP DECISIONS FOLLOWING HAMSTRING INJURIES

The evaluation of health and the assessment of participation risk primarily involves close consultation between the athlete and the physician. However, decision modifiers may extend to include the influence of coaches, athletic directors, family members, agents and even the media – far beyond the clinical role of the physician. The significance of these decision modifiers cannot be overstated.

The risk of hamstring re-injury, recurrent injury and subsequently prolonged loss of playing time is only one of many associated with returning to sports participation, but is indeed the main disadvantage of unintentionally allowing a premature RTP. Of course, for the athlete, as highlighted in Figure 1, there will be many factors at stake. These include, but are not limited to:

- **social** (e.g. the athlete's status as a national hero or self-perception of being a super-star; at a non-elite level, peer pressure from friends and team mates),
- **economic** (e.g. endorsement deals for athletic apparel, sponsorship by an international sporting corporation),
- **psychological** (e.g. is my hamstring healed enough for me to trust training and competing at the same level I attained prior to injury without getting hurt?) and even
- **legal issues** (e.g. what liability does the team or coach or physician face returning the athlete to full participation?).

Similarly, medical interventions such as the controversial use of analgesia for masking hamstring pain may, in combination with the above pressures, modify the overall RTP decision from that based purely on Step 1 and 2 factors. Similarly, a physician's fear of litigation or negative outcome could also impact RTP. All of these and other factors can substantially modify what is considered an acceptable level of participation risk or appropriate RTP decision, and must therefore be considered in the RTP process.

Role of the coach

The role of the coach and the setting in RTP decisions cannot be over-emphasised. For any given injury, but especially for a healing hamstring strain that is allowing an athlete to practice at submaximal pace, the RTP decision is greatly influenced by a coach emphasising the role the athlete may play in the next competition. With this in mind, an athlete will likely take on more risk to return to play for major events such as a national championship or the Olympic Games, in comparison with lesser events such as a regional or even a world championship. Similarly, physicians must be aware of ethical factors that may influence their decision making, albeit subtly. For example, when a physician is paid directly by a team, a conflict of interest may potentially arise based on pressure from the managers or owners that leads to a RTP decision that is not necessarily medically sound.

Thus, there are many factors that can potentially modify the RTP decision; each one has merit and those responsible for RTP decisions must at least be aware of and

Images: Runner Derek Redmond being helped by his father across the line after suffering a hamstring injury in the 400 m final at the 1992 Barcelona Olympics.

consider them before the final decision is made.

SPEEDING UP RTP

Athletes and clinicians look for something to speed recovery and RTP after hamstring injuries. The use of a corticosteroid injection to expedite RTP following severe hamstring injuries was reported by Levine et al in 2000 based on their experience in the National Football League. There were several limitations to their findings: their diagnoses were based on clinical findings without imaging studies to corroborate the extent of injury; the study was retrospective and uncontrolled. Because the use of corticosteroids for aiding RTP has not been studied in a blinded, controlled trial, neither clinical significance nor efficacy can be established based on their results. The results on steroid injections have been anecdotal and mixed.

While many sports medicine physicians are accustomed to the specifics of health evaluation and assessing participation risk for athletes, some may not want to consider decision modifiers as important or relevant to the RTP decision; others may disregard decision modifiers all together. However, the above scenarios demonstrate the impact these decision modifiers can have on returning an athlete back to sport and how such modifiers can alter the amount of risk a physician or athlete finds acceptable for that decision.

CONCLUSION

This RTP decision-making model is not meant to imply a successive sequence of steps to which one must adhere in making the call for returning an athlete to sport. Indeed, the significance of later steps such as evaluation of participation risk may or may not be paramount to health status evaluation, depending on the individual case. It may be that psychological factors play more of a role in successfully returning a specific athlete to activity than functional tests. Nevertheless, consideration should be given to all of the points presented in the RTP decision-making model as this important and complex decision is deliberated. Ultimately, every injury will be accompanied by a RTP decision. A standardised approach to this fundamental aspect of sports medicine will benefit athletes and clinicians. Once all the factors involved in the RTP decision-making process are better understood, particularly with questions like how, when, where, why and by whom these decisions are made in different sport settings, the next logical step will be improving and optimising the RTP process.

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