

Return-to-Play Decisions: Are They the Team Physician's Responsibility?

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Objective: Return-to-play (RTP) decisions are a central component of the Team Physician's clinical work, yet there is little more than anecdotal reference to these in the literature. We recently published a 3-step model for return-to-play medical decision making and, in the current paper, undertook a systematic review of the literature to determine the level of evidence in support of this model.

Data Sources: PubMed, Web of Science, and CINAHL electronic databases. Any article specifically related to concussion, head injuries, neck injuries, illness, medical conditions (including cardiovascular and renal), and preparticipation in sport or that reported RTP as a clinical outcome was excluded. Any article that contained a discussion on one of the components of the 3-step decision-based RTP model was included.

Results: We reviewed 148 articles that met the criteria for inclusion and found 98 review articles, 39 original articles, 6 case reports, and 5 editorials. Of these, 141 articles mentioned Step 1 of the medical decision-making process for RTP (*Medical Factors*), 26 mentioned Step 2 (*Sport Risk Modifiers*), and 20 mentioned Step 3 (*Decision Modifiers*). Of the 148 articles in total, only 13 focused on RTP as the main subject and the remaining 135 mentioned RTP anecdotally. Of these 13 articles, 5 were reviews, 4 were editorials, and 4 were original research.

Conclusions: Although 148 articles we retrieved mention RTP in relation to a specific injury, medical condition, or specific topic, only

13 articles focused specifically on the RTP decision-making process, and 6 of 13 were restricted to Step 1 of the 3-step model (*Medical Factors*). Return-to-play is a fertile field for research and thought leadership beginning with a focus on the Team Physician's appropriate role in RTP decision making, particularly considering the factors identified in Step 3 (Decision Modification).

Key Words: return to play, medical decision making, sport participation, injury

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INTRODUCTION

Return-to-play (RTP) decisions are the hallmark of a Team Physician's clinical work.^{1,2} These decisions are so central to the practice of sports medicine that they are regularly mentioned in the news media and are the subject of discussion and debate on a daily basis with physicians, athletes, athletic trainers, and coaches. Return-to-play decisions also have significant legal implications.³ These decisions are complex and have dimensions of concern that go beyond health alone. In addition, previous injury is associated with up to a 4-fold increase in the risk of reinjury, and the treatment of all injuries includes advice on when it is safe to resume sport participation.⁴

Return-to-play decisions are more difficult than they were 20 to 30 years ago when the literature contained lists of medical conditions categorized into absolute and relative contraindications for sport participation^{5,6} and when the culture of sport was less competitive. The problem is that although the process of medical decision making has become more complex, the "lists" have not been replaced with a solid body of medical science regarding RTP. In fact, The Merck Manual⁷ now states, "there are almost no contraindications for sports participation." The result is that each case is individualized, an approach deemed desirable in much of the current literature.^{8,9} However, standardizing approaches in other areas of medicine has led to improvements in quality outcomes¹⁰ and reductions in cost.^{11,12} Thus, it should be the goal of every Team Physician to understand the standard components and process of formulating medical recommendations regarding an athlete's RTP, particularly if the goal is to improve the quality of sports medicine care provided and to ensure that protection of the athlete's health and safety is paramount.

Standardization of the process for making RTP medical recommendations is not just an end in and of itself. The process of discussion, debate, observation, and analysis that

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RAISEM undertakes group research projects on sport injury prevention, exercise medicine, clinical treatment, and return to play. The members of the group include clinicians, content experts, epidemiologists, biomechanists and physiologists, with associated members collaborating on specific projects.

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accompanies standardization increases awareness and knowledge by identifying the complexities not readily apparent from a single perspective. For example, the ultimate RTP decision often involves consideration of nonmedical factors, such as the team's immediate need for the athlete's playing skills; the athlete's strong desire to resume athletic participation for economic or psychological reasons (even before an injury fully heals); pressure from coaches, athletic administrators, and others to "play hurt"; potential legal liability for aggravated injury; and ethical issues regarding the health risks an individual athlete should be permitted to assume. An attempt to (1) clarify the Team Physician's role in the RTP process, (2) standardize the relevant medical factors he or she could consider, and (3) identify the nonmedical factors that should not be overemphasized must necessarily take into consideration and weigh all these factors. It would be a mistake to have concerned parties (eg, athlete, Team Physician, other sport medicine care providers, coaches, team, or educational institution) at odds with each other simply because their frequently differing perspectives are viewed in isolation. In addition, analysis and debate provide an opportunity to tease apart component elements that can be studied individually, thus permitting a greater understanding of the weight, ordering, and interaction of each of these elements in the overall RTP decision process. Finally, scrutiny of this process provides a mechanism by which changes can be introduced and effects observed.

There is some resistance in the medical literature toward attempts to standardize the RTP medical decision-making process. The most common statement relating to RTP recommendations in sport is for each recommendation to be "individualized."^{8,9,13} Our argument is that it is possible to standardize the general "process" of identifying and evaluating the medical risks and still individualize the appropriate specific "treatment." In fact, the need for individualization in formulating RTP recommendations is no different from that in other areas of medicine. Standardized clinical protocols, including the monitoring of specific physiological variables and treatments, are common in medicine. Health care delivery balances standardization for the purpose of improving the quality of health care with individualization that reflects an empathic approach to the unique needs of a patient or population. To discard any interest in standardized approaches under the guise of negatively impacting outcomes or patient satisfaction is both medically and ethically unreasonable.

In virtually all of the literature, the term "return-to-play" is meant, in a general sense, to describe the process of diagnosis, treatment, and rehabilitation of a given injury or illness to determine when an athlete is "healthy" for the purpose of participation in athletic competition. The articles published on this topic come in 3 varieties. The most frequent, by far, are publications on a specific injury or illness with anecdotal reference to factors deemed important in RTP as part of medical management. Less common are those articles that assess various forms of rehabilitation for musculoskeletal injuries and their impact on shortening the time to RTP. The least common are publications that use the time taken for RTP as a dependent variable in assessing various forms of treatment.

Common in much of the literature are statements that are taken to represent the "philosophy" of sport medicine. For example, "the appropriate level of aggressiveness in returning the athlete to sport remains controversial"¹⁴ and "aggressive rehabilitation and early return to competitive activity without compromising healing or long-term functional outcomes."¹⁵ These types of statements have been in the literature for 30 years. They represent an ideal and are all inclusive but have not moved the field forward with respect to understanding the individual components and sequencing necessary to make medically sound RTP decisions that minimize the Team Physician's potential exposure to legal liability.

It is not a trivial undertaking to attempt to understand RTP decisions in a systematic way.^{1,16-18} There are calls for improved documentation and increased research in this area.^{4,19-21} On the other hand, there are acknowledged difficulties, including a complex layer of psychological factors,²²⁻²⁴ ethical issues,^{25,26} and legal²⁷ issues, that are likely responsible for the controversy that exists even when physicians agree on the diagnosis on an athlete's injury.²⁸ At the same time, there are attempts at integrating biologic and rehabilitation factors for RTP²⁹ and the measurement of functional recovery^{30,31} and risk stratification.³²

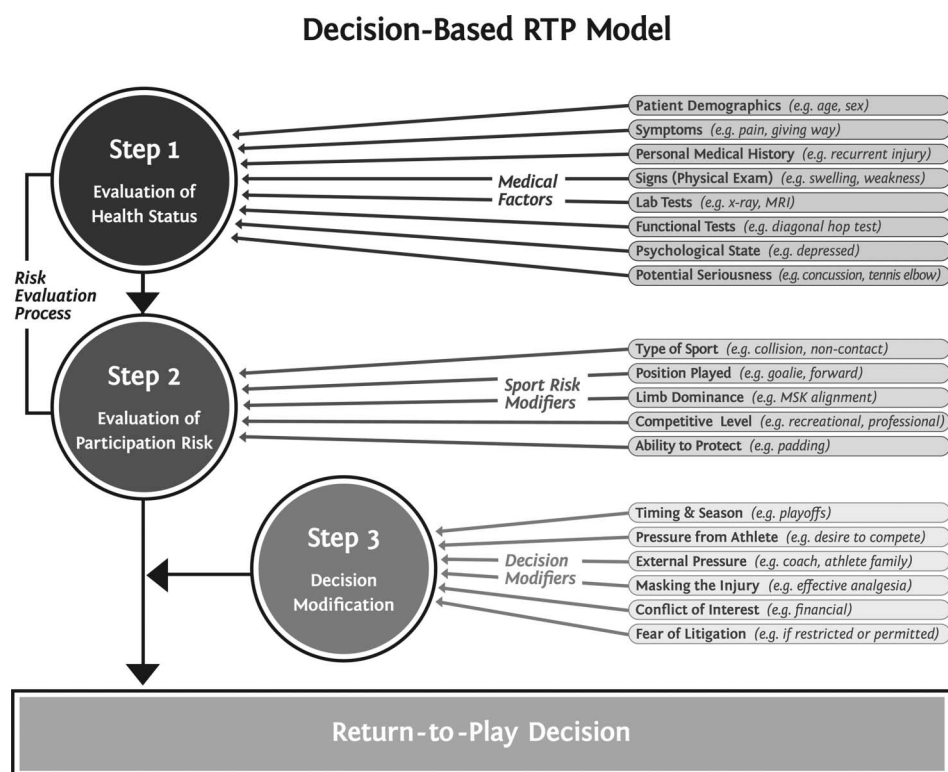
We recently published a 3-step model that provides a framework that can be used to understand many of the above problems using a standardized approach to RTP decisions (Figure 1).³³ We did this to permit Team Physicians to have a common framework as a starting point for making RTP medical recommendations so that each component could be studied individually. In the current article, we undertook a detailed review of the existing literature to find out how much evidence existed within each of the categories identified in the 3-step medical decision-making model.

METHODS

We searched PubMed, Web of Science, and CINAHL electronic databases (without any year restriction) using the search strategy in the Table to identify potentially relevant articles (N = 2054). We excluded any article if the title clearly indicated that it was not related to RTP or that it was specifically related to concussion, head injuries, neck injuries, illness, medical conditions (including cardiovascular and renal), and preparticipation in sport. After deleting duplicates and non-English articles, the remaining abstracts were searched and 272 articles were considered of potential interest. We retrieved the full text of 191 articles that were available from Stanford University and included any article where the authors discussed one of the components of the RTP decision-based model; we excluded any article that only reported RTP as a clinical outcome.

Using a standardized form, one reviewer extracted data and a second reviewer validated the work; discrepancies were resolved by consensus. We recorded (1) the type of study (eg, review, editorial, original research), (2) whether the topic of the article was related directly to RTP (ie, addressing specific elements of the decision-making process) or to a specific topic (eg, musculoskeletal, ethical, pharmaceutical, legal, or psychological issues and the RTP was mentioned in passing),

FIGURE 1. Three-step decision-based RTP model. The decision-based RTP model for an injury or illness is specific to the individual practitioner making the RTP decision. The large black 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 right 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 reinjury and long-term sequelae risks are high (eg, 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 minimize 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 nonfinancial 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, and decisions to not clear an athlete for participation are revisited as the healing process continues; the decisions that allowed an athlete to play are revisited if symptoms or signs recur or if the status of any of the *Sport Risk Modifiers* or *Decision Modifiers* is changed.



and (3) which component of the 3-step RTP decision-based model was discussed.

RESULTS

Of the 191 articles retrieved, 148 met the full inclusion criteria. Of these, 98 reviewed a specific topic (most often musculoskeletal issues, although medication, psychology, ethics, and legal considerations were also topics), 39 were original research on musculoskeletal injuries, 6 were case reports, and 5 were editorials.

Among the 191 articles, 141 articles mentioned Step 1 of the medical decision-making process for RTP (*Medical Factors*), 26 mentioned Step 2 (*Sport Risk Modifiers*), and 20 mentioned Step 3 (*Decision Modifiers*). Return-to-play was mentioned anecdotally in 135 articles, and only 13 focused on RTP as the main subject of the article. Of these 13 articles, 5 were reviews, 4 were editorials, and 4 were original research. These data are summarized in Figure 2.

DISCUSSION

We found only 13 articles written on the specific topic of RTP. Three of the 4 original research articles focusing on RTP involved the measurement of psychosocial issues, such as competency, relatedness, and autonomy,³⁴ in adjustment to RTP.^{35,36} The article by Clover and Wall³⁷ is an excellent argument for introducing the concept of guidelines. The guidelines of the American College of Sports Medicine are a good attempt to define the various factors essential for high-quality RTP decisions.⁹ The review of Putukian³⁸ points to many of the important issues Team Physicians struggle with in RTP decisions. The review of Myklebust and Bahr³⁹ is noteworthy because it is one of the very few that asks the question “what is best in the RTP for the long-term health of an athlete?”

Of the 135 articles that mentioned RTP anecdotally in reference to the main subject of the article (musculoskeletal, medical, psychological, legal, ethical, or pharmaceutical issues), the majority talked about Step 1 (*Medical Factors*)

TABLE. Publications Related to 3-Step Return-to-Play Model

Publication	Search Strategy	Results	Duplicates
PubMed	"return to play"[All Fields] OR "return to sport"[All Fields] OR (("medical decision-making"[All Fields] OR ("Med Decis Making"[Journal] OR ("medical"[All Fields] AND "decision"[All Fields] AND "making"[All Fields]) OR "medical decision making"[All Fields]) OR "readiness"[All Fields] OR "clearance"[All Fields] OR "qualification"[All Fields] OR "disqualification"[All Fields]) AND ("sports"[MeSH Terms] OR "sports"[All Fields] OR "sport"[All Fields]))	1560	3
Web of Science	("return to play" OR "return to sport" OR (("medical decision-making" OR medical decision making OR "readiness" OR "clearance" OR "qualification" OR "disqualification") AND sport))	728	389
CINAHL	("return to play" OR "return to sport" OR (("medical decision-making" OR medical decision making OR "readiness" OR "clearance" OR "qualification" OR "disqualification") AND sport))	497	339
Total		2785	731
Titles included		2054	

The table shows the number of publications retrieved categorized by article type (review, original research, editorial, or case report), the number of articles that clearly referenced topics within Step 1 (*Medical Factors*), Step 2 (*Sport Risk Modifiers*), or Step 3 (*Decision Modifiers*) of the 3-step model, and the number of articles that focused on the specific topic of RTP versus a specific content issue related to sports medicine in which RTP was only mentioned anecdotally (non-RTP).

with much fewer addressing Steps 2 and 3. Of the 13 articles that focused on RTP as the main subject, only 7 addressed Step 2 or Step 3 (Figure 2).

One can argue that these findings are to be expected; the RTP decision process is so complex that it is difficult to apply a rigorous approach to its study. Our motivation in creating an RTP model was to clarify the individual components and their sequence to make it easier to address the issues of concern.³³ What has been missing from our understanding is a systematic evaluation of the nature and extent to which nonmedical factors influence the RTP decision-making process and detailed consideration of who should ultimately decide whether and when the athlete resumes participation in a sport.

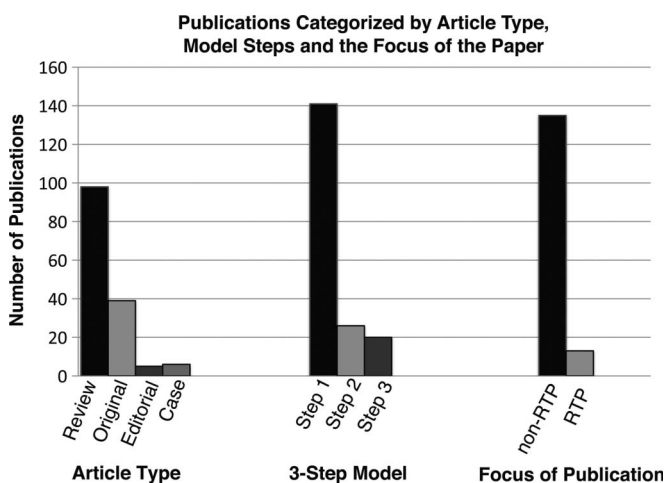


FIGURE 2. Publications Related to 3-Step Return-to-Play Model. This figure shows the number of publications retrieved categorized by article type (review, original research, editorial, or case report); the number of articles that clearly referenced topics within Step 1 (*Medical Factors*), Step 2 (*Sport Risk Modifiers*) or Step 3 (*Decision Modifiers*) of the 3-Step model; and the number of papers that focused on the specific topic of RTP versus a specific content issue related to sports medicine in which RTP was only mentioned anecdotally (non-RTP).

The 3-step model contains 8 *Medical Factors* in the Evaluation of Health Status (Step 1), 5 *Sport Risk Modifiers* in the Evaluation of Participation Risk (Step 2), and 6 *Decision Modifiers* in Decision Modification (Step 3). There remains much to be learned about each of these components with respect to their value in the overall decision. Exploring each of these components will provide us with a better understanding of their weight and also the sequence in which they should be considered. As might be expected, the majority of the articles published are related to Step 1 [Health Status (n = 141)], with much fewer related to Step 2 [Participation Risk (n = 26)] and Step 3 [Decision Modification (n = 20)] (Figure 2).

Although investing time and effort in more fully understanding the different components of these 3 areas is important, we must first ask the question "who" is responsible for the RTP decision. The 3-step model was designed for physicians, but this presupposes that Team Physicians are the best choice to make these decisions as opposed to limiting their recommendations to those concerning risk of reinjury and adverse medical outcomes. The commentary by Levine and Stray-Gundersen⁴⁰ addresses some fundamental issues in Step 3, especially the conflict of interest in physician employment. Ideally, RTP decisions should be consistent with the Team Physician's medical recommendation,³ and most institutions and teams delegate responsibility for making RTP decisions to the Team Physician. Most educational institutions and professional teams do not permit an injured athlete to RTP without medical clearance from the Team Physician.⁴¹ By agreement, the educational institution or professional team normally gives the Team Physician authority to determine their athletes' medical fitness to participate in a sport or RTP after an injury, and courts generally have given legal effect to this arrangement.^{3,41} If medical considerations are the sole or at least the predominant factor in the RTP process (which we believe should always be the case), the Team Physician seems to be in the best position to protect an athlete's health by assuming this "gatekeeper" role.⁴¹ In making an RTP recommendation, the Team Physician should make it clear that he/she considered primarily those factors relevant to the athlete's medical best interests (ie, the medical factors in Step 1 and Step 2).^{3,42}

Although we believe that the Team Physician is in the best position to make a medical recommendation based on the factors in Step 1 and Step 2, this is not necessarily the case for Step 3, which frequently involves consideration of nonmedical factors that may influence the RTP decision. The decision modifiers in Step 3 are actually value judgments that may conflict with the medical factors in Step 1 and Step 2. The question remains whether the Team Physician is in the best position to determine whether these nonmedical value judgments should outweigh medical factors in making an RTP decision regarding an individual athlete. The Team Physician's consideration or weighing of nonmedical factors when making an RTP recommendation increases the risk of malpractice liability if the athlete is *medically* cleared to RTP too soon and suffers an aggravated or enhanced injury.^{3,41}

Compared with Steps 1 and 2 (which involve only the exercise of the Team Physician's medical judgment), there may be multiple people who contribute information regarding the components listed in Step 3: coach or team management (relative importance for timing and season, conflicts of interest), athlete (personal goals, masking of injury with medication), related persons, such as parents, agents, and sponsors (financial considerations), and the institution (fear of litigation). Ideally, the RTP decision should be the product of mutual agreement among all concerned parties and be consistent with the Team Physician's evaluation of the medical risks of resuming sports competition with the athlete's medical condition. Because protecting an athlete's health and safety should be the paramount objective, it is particularly important that the Team Physician have final unchallengeable authority to determine if and when an athlete should be permitted to RTP during the game or sports event in which he or she was injured. In this context, we believe that only medical factors should be considered, not the athlete's "heat of competition" willingness to RTP, which essentially prevents informed consent and would sometimes result in an unacceptable risk of serious injury. In case of disagreement concerning RTP outside the context of game competition, the current legal climate makes it problematic for an educational institution or team to rely on the nonmedical factors advocated by one or more of these parties and to permit an athlete to RTP contrary to the Team Physician's medical recommendation. In such a case, the institution or team invites legal liability if the athlete suffers aggravated injury that could have been prevented if the Team Physician's medical recommendation had been followed.³ Moreover, because this is a matter of law that varies by jurisdiction, it is very difficult to accurately predict whether a court will enforce a contractual waiver purporting to release the institution or team from legal liability for permitting an athlete to RTP contrary to the Team Physician's medical recommendation.³

CONCLUSIONS

There is a general lack of literature concerning all 3 steps of the RTP decision. In addition, there remains controversy as to who should make the RTP decision, particularly with respect to Step 3. At present, the Team Physician is assumed to be responsible for all the 3 Steps in the RTP decision. A

question remains whether Team Physicians are in the best position to make the final RTP decision because they may have the responsibility without authority. Ideal circumstances would see a shared decision model being used that involves the doctor and patient, taking into account other stakeholders. We recommend further research in the form of gathering data from Team Physicians and legal experts to address circumstances where conflict exists between the decision-making parties.

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