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Original article

Use of the stepwise progression return-to-play protocol following concussion among practicing athletic trainers

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Purpose: The purpose of this study was to determine whether practicing athletic trainers (ATs) were using the stepwise progression to make return-to-play (RTP) decisions after concussion and to determine what factors influenced their decision to use the stepwise progression.

Methods: A total of 166 ATs (response rate = 16.6%) completed a 21-item questionnaire that evaluated participant demographics, methods of concussion management, and RTP decision-making using the stepwise progression. Descriptive statistics and a logistic regression were completed to analyze data. The results were as follows: demographic factors such as education level ($p = 0.05$) and number of concussions treated ($p = 0.05$) predicted use of the stepwise progression, whereas sex ($p = 0.17$), employment setting ($p = 0.17$), state law ($p = 0.86$), and years practicing ($p = 0.17$) did not predict whether ATs were following the stepwise progression.

Conclusion: The majority of the ATs from this study are employing the stepwise progression to safely return athletes to play after sustaining a concussion. This demonstrates that ATs are providing a standard of care for concussed athletes across various athletic training settings; however, having a graduate degree and treating more concussions per year are predictors of whether an AT follows all steps of the stepwise progression.

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Keywords: Athletic trainers; Concussion; Concussion management; Graduate degree; Return to play; Sports medicine; Stepwise progression

1. Introduction

The diagnosis and management of concussion injury has evolved within the sports medicine community over the past 2 decades.¹ Concussion injuries can present as a wide range of clinical situations with variable management resources (i.e., athletic trainer (AT) with specialist consultants and investigation tools) that influence the management of concussions.² Regardless of the circumstances, the return to play (RTP) decision after a concussion is ultimately one of the most difficult challenges facing sports medicine professionals.² Sports medicine professionals that take care of concussed athletes have the goal to return the athlete to play as soon as possible without putting the athlete at risk for further injury. RTP decisions must

be comprehensive and include the nature of the injury and any previous history of concussion as well as physical and cognitive function.³

Concussion is a heterogeneous injury; however, it is important that a generalized systematic approach is put into action to manage each injury.⁴ Regardless of level of participation, all athletes with a concussion should be managed using the same foundational RTP model.² Cognitive and physical rest are fundamental treatments of concussion until the athlete's symptoms have resolved.^{2,5} Recently, some researchers have purported that cognitive and physical rest is an ineffective strategy in expediting the recovery process after concussion, but others maintain that there is merit in its use within concussion management.⁶ Throughout most health care facilities this remains the current standard in concussion treatment and is widely practiced. After rest and absence of clinical signs and symptoms of concussion, a graded RTP rehabilitation program can be implemented under the direct supervision of a licensed medical professional. The graded RTP rehabilitation program is known as the stepwise progression in the athletic training community. The stepwise progression protocol is supported by published guidelines and

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consensus statements by the Concussion in Sport Group, American College of Sports Medicine, American Medical Society for Sports Medicine, American Academy of Neurology, and National Athletic Trainers' Association (NATA), although there remains insubstantial evidence for its prescribed clinical use.^{7–11} Current literature is lacking on the practices of using the stepwise progression in the clinical setting; however, the progression is well accepted and should occur before returning to sport.¹²

ATs are the primary health care professionals who are involved in the immediate recognition, diagnosis, and management of concussion injuries in the athletic population. In a survey of 907 National Collegiate Athletic Association (NCAA) member institutions, the AT was reported by 72.8% to be the primary individual who possessed RTP authority.¹³ The current literature on RTP practices among ATs has investigated tools to diagnose and manage concussions; however, there is limited research investigating the use of the stepwise progression to make RTP decisions. Lynall et al.¹⁴ reported that 90% ($n = 1053$) of practicing ATs are using published consensus statements and management guidelines to manage concussions. Similarly, results from a study done by Williams et al.¹⁵ showed that high school ATs are practicing proper concussion management by utilizing objective tools for concussion assessment and that 70% of ATs are returning athletes to participation following established RTP protocols. At the collegiate level, 96.6% of the 327 responding NCAA Division I, II, and III universities stated that they had a concussion management protocol in place, involving RTP.¹⁶ Likewise, in another collegiate study, 80.6% of participating ATs reported using a graded-exercise RTP protocol.¹⁷ State laws, school district policies, and state athletic policy regarding concussions have been shown to restrict ATs from making the final RTP decision by following a stepwise RTP protocol.^{14,18}

Despite increasing research and information on the pathophysiology of concussion and management approaches, the RTP decision is a controversial and difficult task for ATs. The literature is unclear and sometimes contradictory regarding specific management of concussion and RTP. The stepwise progression has been studied and supported by some researchers for its use in clinical practice to aid in recovery after a concussion. However, there have been other studies alleging that immediate cognitive and physical rest only hinder an athlete's recovery, finding that those who did not undergo rest recovered more quickly.⁶ Ultimately, there is a lack of empirical research that has established evidence-based best practices; however, the stepwise progression is becoming the "gold standard" RTP protocol consistently across consensus statements. Therefore, the purpose of this study was to determine whether practicing ATs were using the stepwise progression to make RTP decisions after concussion and to determine what factors predicted their decision to use the stepwise progression. We hypothesized that the majority of ATs were using the stepwise progression to make RTP decisions after concussion and that the decision to use the stepwise progression would be predicted by work setting, state concussion legislation, and/or the concussion policy at their place of employment.

2. Material and methods

2.1. Participants

One thousand NATA members were randomly selected and contacted through a free e-mail listserv for NATA student members. Our sample size was not limited to ATs in any particular setting; rather all certified practicing ATs in all regions of the United States were able to participate. The e-mail was distributed by the NATA office to registered NATA members.

2.2. Instrumentation

The survey instrument was a 21-item questionnaire that was developed using a literature review and an expert review. A panel of certified ATs and sport-related concussion researchers from 2 universities reviewed it for face and content validity. The questionnaire was pilot tested on 8 (5 male, 3 female) certified ATs employed in high school, clinic, and collegiate settings, resulting in a few modifications to survey questions. The survey evaluated methods of concussion management and RTP decision-making using the stepwise progression. The survey obtained demographic information from each participant pertaining to sex, employment setting, education level, state of practice, years of board certification, primary sport coverage, and number of concussions treated annually. The survey also contained questions relating to state concussion legislation, employment concussion policies, athletic conference and high school sport association policies, and legislation requiring use of the stepwise progression for RTP. Questions more specific to the stepwise progression assessed preferred concussion management tools, frequency of use of each step of the graduated stepwise progression protocol, the time period before progressing to the next step of the progression, and which health care provider is responsible for making the final RTP decision. More specific to concussion management tools, participants were also asked their frequency of use of a variety of concussion management tools, including the stepwise progression, when making the RTP decision. Participants were also asked whether they believed that the stepwise progression was a valuable tool for ATs to use when making an RTP decision for concussed athletes.

2.3. Procedure

Approval for the study and use of human participants was permitted by the Michigan State University's institutional review board. A cross-sectional survey was completed online through use of the NATA member e-mail list. Consent was implied when participants clicked on the link to the survey and agreed to participate in the study. The initial e-mail sent out from NATA contained an overview, an explanation for the study, and a hyperlink to the study. One month after the initial e-mail, a reminder was sent out by NATA. Qualtrics.com was the host site for the survey, which took approximately 10–15 min to complete. All responses were returned to the website as anonymous data. Participants were allowed to withdraw at any time without penalty and were allowed to skip questions.

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