
IMPACT CONCUSSION MANAGEMENT SOFTWARE

RETURN-TO-PLAY GUIDELINES

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During the past thirty years, over twenty concussion management guidelines have been published with the intent of providing guidance and direction for the sports-medicine practitioner in making complex return to play decisions. The authors of each of these guidelines also provided an accompanying grading scale designed to reflect and characterize the severity of the injury. Although these guidelines have no-doubt resulted in improved care of the athlete, these multiple directives also created significant confusion and sparked almost continuous debate.

Cantu originally proposed his grading scale and management guidelines based on clinical experience.¹² However, Cantu was careful to emphasize that these guidelines were intended to supplement rather than replace clinical judgment. The original Cantu guidelines allowed return to play the day of injury if the athlete were symptom free both at rest and following physical exertion. For athletes who experienced any loss of consciousness (e.g. grade 3 concussion), a restriction of contact for one month was recommended. Athletes who had suffered a Grade 2 concussion were allowed to return to play in two weeks, if asymptomatic for a period of 7 days.

The Colorado Guidelines¹³ were published in 1991 following the death of a high school athlete due to Second Impact Syndrome and were drafted under the auspices of the Colorado Medical Society. These guidelines allowed for same day return to play if symptoms cleared within 20 minutes of injury. For more severe injury (Grade 3 concussion), these guidelines recommended immediate transport to a hospital for further evaluation. These guidelines were later revised under the sponsorship of the American Academy of Neurology (AAN, 1997)⁴. The AAN guidelines allowed return to competition the same day of injury if the athletes' signs and symptoms cleared within 15 minutes of injury. Grade 2 concussion was managed in a manner similar to the Colorado Guidelines, with return to competition within one week, if asymptomatic.

More recently, Cantu has amended his guidelines¹⁴ to emphasize the duration of post-traumatic symptoms in grading the severity of the concussion and making return to play decisions. Grade 1 concussion was redefined by an absence of loss of consciousness, and post-concussion signs or symptoms lasting less than 30 minutes. Same day return to competition was allowed only if the athlete was completely asymptomatic following the injury.

Although the above mentioned management guidelines reached their zenith of popularity during the 1980's and 1990's, in the late 1990's, sports medicine practitioners and organizations began to question the scientific basis of these guidelines. This trend prompted the American Orthopaedic Society for Sports Medicine (AOSSM) to sponsor a workshop with the purpose of re-evaluating current guidelines and establishing practical alternatives.¹⁵ Although the AOSSM guidelines did not differ substantially from prior guidelines, this workshop started a trend away from the use of a numeric grading systems for determination of return to play following concussion (e.g. as developed by the Cantu, Colorado and AAN guidelines). The AOSSM guidelines were also the first to stress more individualized management of injury, rather than applying general standards and protocols.

Yet another important development with regard to concussion management took place in 2001 under the auspices of the Federation Internationale de Football Association (FIFA) in conjunction with the International Olympic Committee (IOC) and the International Ice Hockey Federation (IHF-see Table 1). The organizers of this meeting assembled a group of physicians, neuropsychologists and sports administrators in Vienna, Austria to continue to explore methods of reducing morbidity secondary to sports related concussion. The deliberations that took place during this meeting lead to the publication of a document outlining recommendations for both the diagnosis and management of concussion in sports. One of the most important conclusions of this meeting was that

none of the previously published concussion management guidelines were adequate to assure proper management of every concussion. The group emphasized the implementation of post-injury neuropsychological testing as the “cornerstone” of proper post-injury management and return to play decision making.

The recognition of neuropsychological testing as a key element of the post-concussion evaluation process represented a particularly important development in the diagnosis and management of the concussed athlete. The use of baseline neuropsychological testing was specifically recommended whenever possible. In addition, a graduated return to play protocol was emphasized. It was specifically recommended that each step would, in most circumstances, be separated by 24 hours. Furthermore, any recurrence of concussive symptoms should lead to the athlete dropping back to the previous level. In other words, if an athlete is asymptomatic at rest and develops a headache following light aerobic exercise, the athlete should return to complete rest.

Table 1: Vienna Concussion Conference: Return to Play Recommendations. Athletes should complete the following step-wise process prior to return to play following concussion.

- 1. Removal from contest following and signs/symptoms of concussion.**
- 2. No return to play in current game**
- 3. Medical evaluation following injury**
 - a. Rule out more serious intracranial pathology
 - b. Neuropsychological Testing considered “cornerstone” or proper post-injury assessment
- 4. Stepwise return to play**
 - a. No activity and rest until asymptomatic
 - b. Light aerobic exercise
 - c. Sport-specific training
 - d. Non-contact drills
 - e. Full-contact drills
 - f. Game play