

# MEDICAL AND SAFETY REFORMS IN BOXING

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The continued existence of boxing as an accepted sport in civilized society has been long debated. The position of the American Medical Association (AMA) has evolved from promoting increased safety and medical reform to recommending total abolition of both amateur and professional boxing. In response to the AMA opposition to boxing, the boxing community has attempted to increase the safeguards in amateur and professional boxing.

The United States of America Amateur Boxing Federation, which is the national regulatory agency for all amateur boxing in the United States, has taken several actions to prevent the occurrence of acute brain injury and is currently conducting epidemiologic studies to assess the long-term neuropsychologic consequences of amateur boxing. In professional boxing, state regulatory agencies such as the New York State Athletic Commission have introduced several medical interventions to prevent and reduce neurologic injury. The lack of a national regulatory agency to govern professional boxing has stimulated the formation of the Association of Boxing Commissions and potential legislation for the federal regulation of professional boxing by a federally chartered organization called the United States Boxing Commission. The AMA's opposition to boxing and the medical and safety

reforms implemented by the proponents of boxing are discussed.

For decades there have been heated outcries for the abolition of boxing for medical and moral reasons. Short of its abolition, others have called for health and safety reforms. Critics of boxing state that self-regulation of the sport by its participants and supporters has been insufficient. In response to the growing public debate and mounting criticism concerning the safety standards of boxing, the boxing community has introduced several medical safeguards. The United States of America Amateur Boxing Federation (USAABF), the New York State Athletic Commission (NYSAC), the Association of Boxing Commissions (ABC), and the federal legislation for the formation of the United States Boxing Commission (USBC) have all been instrumental in addressing the medical issues that plague amateur and professional boxing alike. Critics of boxing are extremely familiar with its shortcomings, but are uninformed about the health and safety reforms that have been introduced. The following review was conducted to summarize the most recent health and safety interventions.

An adequate understanding of the medical opposition and intervention concerning boxing requires knowledge of the medical hazards involved. Because the utmost medical concern in boxing is potential brain damage, the epidemiology and pathophysiology of acute and chronic brain injury need to be considered. Although a complete discussion of the neurologic aspects of boxing is beyond the scope of this paper, the review by Jordan<sup>1</sup> is quite comprehensive.

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**TABLE 1. RECOMMENDATIONS OF THE AMERICAN MEDICAL ASSOCIATION COMMITTEE ON MEDICAL ASPECTS OF SPORTS, 1962**

1. A thorough medical examination of each contestant prior to bouts by a physician responsible for determination of the boxer's fitness to participate
2. At least one physician present at all bouts with absolute authority to terminate the contest for medical reasons
3. Interruption by the referee or physician of any bout with the opponent declared winner when a contestant sustains more than one knockdown in any one round or evidences inability to control the position of the head
4. Automatic suspension of any participant who sustains a knockout, technical knockout, or other severe injury for as long as medical consultants feel is necessary
5. The universal adoption of the new unapproved shock-absorbing ring padding under the canvas and on the posts of the ring to aid in prevention of injuries caused by striking the head against unpadded surfaces
6. The required use of headgear to minimize lacerations and contusions, and properly fitted mouthpieces to protect the teeth and supporting tissues
7. Coaching and training of a quality to assure the maximum protection that skillful performance and good condition can provide
8. Referees familiar with, and alert to, the health hazards inherent in boxing

## THE AMA ON BOXING

Historically, the American Medical Association (AMA) has expressed its concern about the potential medical hazards of boxing for over two decades. In 1962, the AMA formed the Committee on Medical Aspects of Sports, which was established to address the health aspects of boxing and other sports.<sup>2</sup> After careful review of the scientific literature, and after considering the arguments presented by the opponents and proponents of boxing, the committee concluded that the sport of boxing is a debatable and unsettled issue that could not be resolved easily. Accordingly, the committee recommended many health and safety provisions that should be implemented before boxing is permitted (Table 1). In addition, the committee also suggested that other potential safety measures be considered. These included experiment-

**TABLE 2. RECOMMENDATIONS OF THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON SCIENTIFIC AFFAIRS, 1983<sup>3</sup>**

1. Encourage the establishment of a National Registry of Boxers for all amateur and professional boxers, including sparring-mates, in the country
2. Plan and conduct a conference with the appropriate representatives to review criteria for the physical examination of boxers, to determine other comprehensive medical measures necessary for the prevention of brain injury, and to develop specific criteria for the discontinuance of a bout for medical reasons
3. Recommend that the ring physician be authorized to stop any bout in progress, examine a contestant and, when indicated, terminate a bout that might result in serious injury
4. Urge state and local commissions to conduct frequent medical training seminars for all ring personnel
5. No boxing contests should be permitted unless (1) the contest is held in an area with adequate neurosurgical facilities, (2) advanced life-support systems are available at ringside, and (3) a comprehensive evacuation plan exists for the removal of any seriously injured boxer to hospital facilities
6. The condemnation of unsupervised boxing competition between unlicensed boxers in "tough man" contests
7. Mandate the use of safety equipment, such as plastic safety mats and padded cornerposts, and encourage continued development of safety equipment
8. Extend all safety measures to sparring equipment
9. Upgrade standardization and strict enforcement of medical evaluations for boxers

ing with less padding in the glove and the prohibition of wrapping the hands to reduce the force of the blow. It was suggested also that the system of point scoring be revised to emphasize skillful offensive and defensive maneuvering instead of the knockout blow. Research designed to develop a protective headguard was also suggested.

In 1983, the AMA Council on Scientific Affairs<sup>3</sup> established the Medical Advisory Panel on Brain Injury in Boxing. The panel concluded that to ban the sport of boxing was not a realistic approach and recommended improvements in administrative and medical standards (Table 2). The council report sup-

ported the formation of a national regulatory agency that would utilize a computer-based central registry to record the results of all licensed bouts and maintain an accurate account of all boxing injuries, including technical knockouts (TKOs) and knockouts (KOs). This national registry would limit the incomplete and fragmentary exchange of information between state or local boxing commissions that exists in professional boxing. The accurate exchange of information would prevent boxers who were medically suspended in one state from going to another jurisdiction to compete.

Ever since the position statement of the Council on Scientific Affairs,<sup>3</sup> the AMA's position has evolved from that of medical reform and safety revisions to complete abolition of amateur and professional boxing. On three separate occasions the AMA has voted for the abolition of boxing.<sup>4</sup> These resolutions called for abolition of both amateur and professional boxing so as to assist state medical societies and state legislatures in enacting laws to eliminate boxing. To date, the AMA continues to support the total abolition of all boxing. In addition, other medical organizations, such as the American Academy of Pediatrics, the American Association of Neurological Surgeons, the American Neurological Association, and the American Academy of Neurology have supported the abolition of boxing in the United States.<sup>5</sup>

## BOXING COMMISSIONS

### United States of America Amateur Boxing Federation

The United States of America Amateur Boxing Federation (USAABF), the national regulatory agency for all amateur boxing in the United States, has been instrumental in promoting safety in amateur boxing. The medical interventions of the USAABF, a subunit of the United States Olympic Committee, are listed in Table 3. The formation of the USAABF is probably the single most important safety factor introduced into amateur boxing. The establishment of this national regulatory agency enables the enforcement of uniform medical standards throughout the United States.<sup>6</sup> Unlike its professional counterpart, which lacks a national regulatory agency, the USAABF is more capable of conducting effective medical surveillance of its boxers. When an amateur boxer is medically suspended, the national office is notified, and continued boxing is prohibited. To further prevent a suspended boxer from fighting, the boxer's "passport" is taken away. The passport doc-

**TABLE 3. MEDICAL INTERVENTIONS RECOMMENDED BY THE UNITED STATES OF AMERICA AMATEUR BOXING FEDERATION IN AMATEUR BOXING**

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1. Formation of a national regulatory agency, the USAABF, to enforce uniform medical standards
  2. One or more physicians must be in attendance at all amateur boxing shows and must be prepared to deal with any emergency that may arise
  3. Contestants shall be thoroughly examined immediately before and after each bout
  4. A physician may, at his own discretion, enter the ring immediately if a bout ends in a knockout or if it is stopped because of an injury
  5. The attending physician may suspend a bout at any time if in his/her opinion a contestant is in danger of further physical injury
  6. Any boxer rendered unconscious or who receives excessive blows to the head is medically suspended
  7. Before resuming boxing, after medical suspension, the boxer must undergo a medical examination
  8. Any boxer that is medically suspended secondary to head blows is issued a Restrictions Affidavit
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uments the outcome of previous fights and provides an updated account of the boxer's activities. Presentation of this passport is mandatory before any amateur boxer can participate in competition.

The USAABF also advocates an active role for the ringside physician. The ringside physician has the authority to terminate a bout if a boxer is injured or is at risk of further physical injury. This authority can be particularly important if the referee fails to recognize an injured boxer, or if a boxer is unable to properly defend himself.

### New York State Athletic Commission

Professional boxing is regulated at the state or local level and lacks a formal national regulatory agency. Accordingly, there are over 40 state or local boxing commissions with varying standards of medical supervision. The NYSAC<sup>7</sup> probably is the most strictly medically regulated boxing commission in the country and has been in the forefront of implementing safety measures in professional boxing (Table 4). The most important medical intervention of the New York State Athletic Commission (NYSAC) is the utilization of neurodiagnostic testing. In addition to a

**TABLE 4. MEDICAL INTERVENTIONS IMPLEMENTED BY THE NEW YORK STATE ATHLETIC COMMISSION**

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1. Two ringside physicians at all fights who have the authority to terminate the fight
  2. Medical Advisory Board that advises the NYSAC regarding medical aspects of boxing
  3. Utilization of the thumbless glove
  4. Mandatory suspension of boxers who loose six consecutive fights
  5. Medical suspension for a boxer sustaining a knockout or technical knockout
  6. Mandatory neurological examination, computerized tomographic scan, and electroencephalogram for boxers medically suspended after a knockout or technical knockout
  7. Annual dilated eye examination by an ophthalmologist
  8. Annual neurological examination; computerized tomographic scan and electroencephalogram
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detailed neurologic examination prior to obtaining a license to box professionally in New York State, each boxer is required to submit to an electroencephalogram (EEG) and a computerized tomographic (CT) scan. An abnormal neurodiagnostic test would prevent boxers with subclinical neuropathology from boxing. Furthermore, it would provide data on the prevalence of CT and EEG abnormalities in active professional boxers, utilizing a large population base. In addition to this annual neurologic evaluation, any boxer sustaining a KO or TKO is medically suspended from boxing for a minimum of 45 days and is required to undergo a neurologic examination, CT scan, and EEG before reinstatement.

Recently, the NYSAC has also required a complete annual eye examination by an ophthalmologist of all active boxers. The major advantage of this intervention is the full visualization of the retina. Although all boxers undergo a direct ophthalmoscopic examination prior to all bouts, an indirect funduscopic evaluation with dilated pupils can detect retinal tears, holes, or detachment that might be otherwise undetected by the ringside physician. To further prevent eye injuries, the NYSAC has also introduced the thumbless glove to prevent thumbing injuries to the eye.

Similar to the USAABF, the NYSAC advocates active involvement of the ringside physician. At all

**TABLE 5. MEDICAL AND SAFETY RECOMMENDATIONS OF THE ASSOCIATION OF BOXING COMMISSIONS**

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1. A minimal standard for medical examinations
  2. Develop a nationwide computer network to track activities of professional boxers
  3. All states should develop a boxer passport and enforce its use
  4. All states should attempt to regulate and inspect boxing gyms
  5. No individual should be allowed to begin training as a professional boxer without first having a complete physical examination
  6. All states recognize the medical suspensions of other states
  7. All states establish medical advisory boards
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professional bouts in New York State, two physicians who are trained and selected by the NYSAC are required at ringside. The ringside physician can exercise the option to terminate a fight if a boxer is injured or defenseless. In addition to the ringside physician, an ambulance must be on the premises. This will ensure swift emergency evacuation of an injured boxer.

**The Association of Boxing Commissions**

The Association of Boxing Commissions (ABC) represents the first active attempt by the boxing community to establish a national regulatory body for professional boxing in the United States. The ABC is a nonprofit organization designed to promote safety in professional boxing.<sup>8</sup> Membership in the ABC is voluntary and is open to the boxing commissions of each state of the United States, Puerto Rico, the Virgin Islands, the provinces of Canada, and the states of Mexico. Because membership in the ABC is voluntary, and because the ABC has no executive authority over the participating local or state boxing commissions, the effectiveness of the ABC to regulate professional boxing is dependent on the cohesiveness and mutual cooperation of the participating commissions. Thus far, the ABC has been effective in establishing guidelines for the improvement of boxing and has the participation of a majority of boxing commissions, including the more active commissions such as Nevada, New Jersey, New York, and Texas.

The medical and safety recommendations of the ABC<sup>9</sup> are shown in Table 5. One of the major rec-

ommendations of the ABC is the establishment and utilization of the boxer passport system. The passport system, along with the development of a nationwide computer network, would afford a mechanism for the medical surveillance of professional boxers. For identification purposes, each passport would contain a photograph of the boxer, his name, address, date of birth, weight, height, hair color, and signature. In addition, the passport would include the medical record and the boxer's history, detailing the outcome of all bouts, and documenting all medical suspensions. It is recommended that the boxer's passport be presented at each and every fight. Failure to show the passport may result in a fine or in a suspension from the fight. In the event of a medical suspension, it is suggested that the passport be sent to the governing commission to further prevent the boxer from fighting until the suspension is lifted.

A novel, but necessary, recommendation of the ABC is the regulation and inspection of boxing gyms. The rationale for this safety intervention is to reduce the potential for medical injury during training. It is a well-understood fact that the majority of boxing occurs during training. Therefore, it is advisable that sparring be conducted under the safest conditions possible. The routine inspection of boxing gyms would enforce the adherence to safety precautions and prohibit boxers who are medically suspended from sparring and risking further injury. The strict regulation of boxing gyms would also provide a mechanism to enforce another ABC recommendation: that no individual be allowed to begin training as a professional boxer without first having a complete physical examination.

## FEDERAL REGULATIONS

Historically, with the exception of the ABC, the ability of the professional boxing community to regulate itself on a national basis has been negligible. Accordingly, a proposal for the federal regulation of boxing is currently in Congress.<sup>10</sup> The Richardson Boxing Bill (HR 2127) calls for the formation of the United States Boxing Commission (USBC), a federally chartered, nonprofit corporation that would regulate professional boxing on a national level. The purposes of the USBC are similar to those of the ABC (Table 6). Unlike the ABC, however, the USBC could exert more authority over the local or state commissions.

**TABLE 6. PURPOSES OF THE UNITED STATES BOXING COMMISSION**

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1. Propose rule changes in boxing to ensure the safety of its participants and establish uniform rules for state athletic or boxing commissions
  2. Research the causes of boxing-related injuries and recommend preventive steps
  3. Establish minimum standards and procedures for physical and mental examinations
  4. Establish minimum standards for the availability of medical services at professional boxing matches
  5. Establish voluntary life and health insurance funds for professional boxers
  6. Establish a national computer system to collect, store, and retrieve medical information and boxing histories of professional boxers
  7. Research and establish minimum standards for the manufacturing and use of boxing equipment
  8. Provide a mechanism for the national certification of professional boxing assistants, including trainers, referees, judges, and ringside physicians
  9. Work with international boxing organizations to establish international standards
  10. Review existing state athletic or boxing commission rules and regulations for professional boxing and provide assistance in meeting minimum health and safety standards
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As the national regulatory agency for professional boxing, the USBC can establish a voluntary life and health insurance program for professional boxers. In view of the potential hazards associated with boxing, a health insurance plan is almost mandatory. Another function of the USBC is that it could serve as a resource for the medical investigation of boxing-related injuries.

## DISCUSSION

Medical and safety precautions to prevent or manage acute boxing injuries have been well implemented in both amateur and professional boxing. The authority granted ringside physicians to terminate a bout, the proper medical screening of boxers, and the availability of emergency medical services make the acute neurologic injury associated with boxing less of a medical concern. In modern-day boxing, the emphasis is beginning to shift to the prevention of chronic neurologic injuries.

The prevention of chronic neurologic injury, however, requires epidemiologic research to determine the risk factors. Since chronic neurologic injuries (ie, chronic traumatic encephalopathy or dementia pugilistica) often occur long after a boxer has ceased his career, its prevention is difficult. Ideally, this would require a prospective evaluation of a cohort of boxers over an extended period of time; to date this has not been performed. Currently, a prospective epidemiologic evaluation of amateur boxers is being conducted to determine the long-term effects of boxing on neuropsychologic functioning. Although this project will not address specifically the chronic neurologic injuries of boxing, it will determine to what extent amateur boxing is hazardous to the well-being of its participants. Currently, it is an unanswered question whether amateur boxing alone can cause chronic brain damage.

In response to the medical community's condemnation of amateur and professional boxing, the boxing community has made several instrumental attempts to increase medical safety. Although the critics of

boxing correctly cite the inherent dangers associated with it, many remain uninformed about the medical and safety reforms in the sport of boxing.

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