SKIN INFECTIONS IN COMBAT SPORTS ATHLETES: POSITION STATEMENT OF THE ASSOCIATION OF RINGSIDE PHYSICIANS

AUTHORS: Kevin deWeber, MD, FAMSSM, FAAFP, FACSM
(Corresponding Author: kdeweber@peacehealth.org)

John Neidecker, DO, ATC, FAOASM; President, Association of Ringside Physicians
Dan Fosselman, MD, FAAFP, CAQSM;
Thomas Lam, MD, FAAD

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Abstract and Position Statement

The prevalence of infectious skin conditions is high in combat sports athletes, so primary and secondary prevention, early recognition of infection, and sports restriction during treatment are critically important to minimize the burden of suffering. Given the paucity of evidence-based guidelines, consensus return-to-sport guidelines published by the National Federation of High Schools (NFHS) and the National Collegiate Athletic Association (NCAA) should continue to be utilized by physicians, coaches, officials and athletes. Exceptions to these guidelines may be considered for elite and professional athletes or non-elite athletes in high-stakes competitions with conditions that have relatively low morbidity and high cure rate such as tinea corporis, common warts and molluscum contagiosum. Another recommended deviation from the NFHS/NCAA guidelines is restriction from contact sports activities until completion of 6 to 10 days of oral antiviral treatment for primary or recurrent herpes gladiatorum to reduce the risk of viral spread. Coaches, athletes, and medical providers should strongly consider prophylaxis of elite combat sports teams (those who train with each other) with daily antiviral medication to reduce the risk of both new and recurrent HSV infections that can lead to lost training or cancelled competitions. Likewise, they should strongly consider prophylaxis of any team which has a history of tinea corporis or tinea capitis with periodic oral antifungal medication.

Development of this Statement

The Association of Ringside Physicians (ARP), an international non-profit organization dedicated to the health and safety of the combat sports athlete, sets forth this Position Statement to establish management and prevention guidelines that ringside physicians, athletes, referees, trainers, promoters, sanctioning bodies, and other healthcare professionals can use in the combat sports competition and training settings. This position statement expresses a collaborative effort among the ARP Board of Directors, Emeritus Board, and subject- matter experts. A writing group of specialists in family medicine, dermatology, and sports medicine was appointed by the ARP Board of Directors to develop this Position Statement based on a systematic review of the literature and expert opinion. An extensive literature search including but not restricted to MEDLINE, Cochrane Reviews and non-indexed, peer-reviewed articles published in online medical journals was performed using search terms of combat sports, sports, boxing, martial arts, and specific infectious skin conditions.

Dermatologic infectious conditions are highly prevalent in combat sports. The skin infection rate was found to be 14.23 per 10,000 athlete-exposures in collegiate wrestlers.[1] This is significantly higher than the prevalence in high school athletes of 2.27 per 100,000 athlete exposures.[2] Twenty-two percent of these skin infections become recurrent. Most infections (67.9%) are acquired during the regular competitive season. They are most often identified during practice and result in loss of training time.[1] The burden of suffering is significant. A National Collegiate Athletic Association (NCAA) study suggested that up to 20% of wrestlers lose training or competition time each year due to skin infections.[1] Tinea corporis gladiatorum affects about 60% of collegiate wrestlers and 52% of high school wrestlers each season.[3] About 76% of college wrestlers are carriers of community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA), and 0.9% of high school wrestlers contract a CA-MRSA infection each season. It appears that the longer an athlete participates in contact sports the incidence of CA-MRSA increases.[4] Currently there is no available data on the incidence of infectious dermatologic conditions in professional versus amateur athletes in combat sports.

Common Skin Infections Found in Sports

Bacterial Infections

Staphylococcus or *Streptococcus* pathogens encompass most bacterial skin infections.[3,5,6,7] Bacterial skin conditions are named based on which dermatological layers are affected. The mainstay of treatment for bacterial skin infections is antibiotic therapy. Topical and/or oral medications can be selected with initial treatment focused on common *Staphylococcus* or *Streptococcus* susceptibility, keeping in mind local susceptibilities. Contacting the local tertiary infectious disease department to determine antibiotic susceptibilities is good antibiotic stewardship practice.[3,8] This can be challenging when competitors are presenting from different geographic regions. Oral medications may be chosen based on clinical judgment, lesion size, compliance, athlete immune status and timing of competition. Whenever possible, culture and sensitivity of lesions prior to initiating antibiotic therapy is also recommended.[9] Antibiotics should be adjusted based on sensitivity results, if needed.

For all bacterial skin infections, as soon as the diagnosis is suspected, the athlete should be isolated from training partners.[9] Lesions are highly contagious, and covering of untreated lesions to allow participation in contact sports should be strictly forbidden. Return to contact sports activities requires meeting several criteria: completion of a 72-hour course of directed antibiotic therapy, no new skin lesions for at least 48 hours, no drainage or exudate from the wound, and no systemic signs or symptoms (e.g. fever, malaise).[9-12]

Non-purulent Skin Infection (Impetigo/Cellulitis/Erysipelas)

The diagnosis of bacterial skin infections is based on clinical history and characteristic appearance.[9] Impetigo is a superficial infection localized to the epidermis.[6] Erysipelas is localized to the upper dermis and skin lymphatics; cellulitis goes deeper, involving the dermis and subcutaneous fat.[7] Cultures can be obtained for definitive diagnosis and antibiotic sensitivities. Impetigo treatment often includes topical mupirocin, fusidic acid, or retapamulin.[9] Cellulitis requires systemic (usually oral) antibiotics.[7,9] Treatment should include oral antibiotics such as penicillin, amoxicillin, clindamycin, or trimethoprim-sulfamethoxazole.[13]

Purulent Skin Infection (Folliculitis/Abscess)

Folliculitis is an infection of an epidermal hair follicle. A furuncle is an infection that involves a coalescence of multiple follicles but remains in the epidermis and can be treated with topical or oral antibiotics. A carbuncle or "boil" is a furuncle that has progressed into the dermis and subcutaneous fat.[14] Treatment may include incision and drainage (I&D) if an abscess is present. Oral antibiotic therapy is warranted for multiple lesions, surrounding cellulitis, signs of systemic illness or poor response to I&D.[9,13-16]

Methicillin-Resistant Staphylococcus aureus (MRSA)

Special consideration should be given for MRSA, which has more antibiotic resistance and can result in higher morbidity and mortality.[10,17] MRSA skin infections often present initially like non-MRSA skin infections but can progress more rapidly.[17] For localized MRSA infections, trimethoprim-sulfamethoxazole (TMP-SMX), tetracyclines (doxycycline, minocycline) or clindamycin are the recommended first-line options.[18] Early I&D is important for obtaining cultures and antibiotic sensitivities and in speeding resolution of infection. If an athlete has extensive soft tissue involvement, systemic toxicity (fevers, malaise, nausea, etc.), or persistent symptoms after 72 hours of oral therapy, parenteral antibiotic therapy may be warranted.[19]

Fungal Infections

Fungal skin infections most seen in athletics involve the *Trichophyton* genus and are further named based on the affected body region.[3,5] The treatment and return to competition guidelines vary based on infection location. These infections have very little morbidity, have relatively lower transmission rates than bacterial and viral infections, and are easily cured with antifungals. Therefore, while preventing widespread outbreaks by withholding infected athletes from contact sports is effective, there are certain exceptions to this rule, in our opinion.

Tinea corporis

Tinea corporis or "ringworm" is a fungal infection on the trunk or extremities.[5] Diagnosis can be made empirically by its classic appearance, or definitively with culture or KOH preparation or a scraping from the lesion.[9] Untreated athletes should be withheld from competition if all lesions cannot be covered with reliable dressings, with the exceptions noted below. Treatment consists of topical antifungals such as terbinafine, naftifine, ciclopirox, or oxiconazole twice daily, usually for two weeks. If extensive lesions are present, systemic antifungal treatment is indicated.[9]

NFHS guidelines and other sources recommend that athletes may return to competition after 72 hours of treatment and the lesions must be covered.[9,10,12] However, we agree with NCAA wrestling guidelines which state that tinea corporis infections can be evaluated on an individual basis. It recommends allowing wrestlers to compete with untreated lesions that are solitary or closely clustered and can be covered adequately.[11] Since tinea corporis is usually asymptomatic, has a relatively low contagion potential compared to viral and bacterial conditions, and is easily cured with well-tolerated medications, we believe this exception is reasonable to apply to other elite athletes and in high-level youth competitions where the stakes are relatively high, e.g. state, regional, national, or international championships. Note that some sports, leagues, or jurisdictions do not allow covering skin lesions during competition. Furthermore, skin coverings may become removed during competition. Therefore, the opponents of infected athletes should provide written, informed consent about the risk of acquiring tinea and how it may be prevented with post-exposure oral antifungal medication. (See Secondary Prevention and Prophylaxis below.)

Tinea Capitis and Tinea Barbae

Tinea capitis and tinea barbae are fungal infections involving the scalp or beard, respectively. Diagnosis can be made empirically by appearance, or definitively with culture or KOH preparation or a scraping from the lesion.[3,9] These variants are deeper and more difficult to treat because of hair follicle involvement and sometimes produce transudative or purulent discharge.[3] Topical antifungal treatments alone are not adequate, and longer periods of oral antifungal treatment are needed; withholding untreated athletes from competition is important and should be non-negotiable. Oral terbinafine, fluconazole, itraconazole, or ketoconazole are effective.[9] Return to contact sport requires completion of 14 days of oral antifungal treatment.[11,12] Concomitant use of a topical antifungal is also recommended during oral treatment and in the weeks following to reduce the risk of spread from continued shedding of fungal spores.

Selenium sulfide shampoo or ketoconazole shampoo 1-2% should be used before practice until all scalp lesions are gone.[9]

Viral Infections

Herpes Simplex Virus

Herpes simplex virus (HSV) can involve any body region but most commonly is found on the lips (herpes labialis, or "cold sore").[20] Herpes gladiatorum is an infection of any other part of the body in the athletic setting, most commonly the face. The most likely pathogen is HSV1. Transmission is thought to be exclusively from direct skin-to-skin contact.[3] Numerous studies have demonstrated that training mats or equipment do not significantly contribute to the spread of infection.[21-24] The classic lesion involves a burning or tingling sensation in the affected area, followed in hours to days by an eruption of tightly clustered painful vesicles on an erythematous base. Lesions are highly contagious and can last for days to weeks, creating a significant burden of suffering and precluding athletic participation for significant time periods. The virus also remains dormant in the spinal nerve root ganglia for a lifetime and may reactivate with various triggers, producing unpredictable recurrent outbreaks and heavy viral shedding. Therefore, strict guidelines on withholding untreated athletes from contact activities is paramount for preventing spread. Also problematic is the low-level viral shedding that occurs in some asymptomatic athletes.

Primary (first-time) HSV infections can be more severe than recurrences and may present with systemic symptoms followed by eruption of skin lesions.[9,24] In immunocompetent individuals, primary HSV infection resolves over days to a few weeks, but the virus will lay dormant in neural ganglia for a lifetime. Diagnosis is made empirically by the classic appearance of lesions, or definitively by viral culture and HSV polymerase chain reaction.[3] Culture should be obtained from freshly ruptured vesicles and should be collected using a swab/media that does not contain alginate (which inhibits HSV growth) and has a plastic or metal shaft (wood may be toxic to HSV in culture).[21,25,26] The most problematic HSV infections are ones that involve the eyes. In addition to being extraordinarily painful, ocular infections can cause irreversible corneal scarring or blindness.[27] Treatment of primary HSV infection consists of 7 to 10 days of oral antiviral medication such as acyclovir, famciclovir or valacyclovir. Prior to return to contact sports the athlete must have completed at least 120 hours of systemic antiviral therapy, be free of systemic symptoms, have no new lesions for 72 hours, and all remaining lesions must be surmounted by firm adherent crust.[9-11] NFHS guidelines recommend completion of 10 days or oral antiviral treatment before resuming contact sport activities. We believe this 10-day restriction period is more prudent due to the continued viral shedding that continues after only 5 days of treatments, as discussed below.

Recurrent HSV Infection

Recurrent infections can manifest at any time but are usually associated with periods of weakened immune system or stress.[28] Treatment involves a course of oral antivirals; topical therapy is ineffective and not recommended.[29] Although NFHS and NCAA guidelines recommend allowing return to practice/competition after 120 hours of antiviral treatment, assuming all lesions are crusted,[11,12] one small study in wrestlers treated with valacyclovir 1000 mg once daily showed that viral shedding continued for 5.9 to 10.4 days, with an average of 8.14 days.[30] Therefore, a longer period of treatment during contact sport restriction (6 to 10 day) may be prudent to prevent spread of the virus. As with primary infection, in addition to completing the required days of antiviral medication, there must be no new lesions for 72 hours, and all remaining lesions must be surmounted by firm adherent crust before returning to contact activities. The ARP does not support return to contact sports after less than 5 full days of antiviral treatment, and we advise obtaining written, informed consent of the opponent(s) of athletes treated for less than 10 days. Opponents should be aware that

Figure 1. Best Practices for Primary Prevention of Skin Infection.

1. Practice good personal hygiene.
    a. Wash hands before practice with soap and water or sanitizer.
    b. Wear clean clothing that protects your skin from abrasions.
    c. Shower immediately after practice with liquid (not bar) soap; if showers are not available, soap-and-water wipes are preferable to not washing at all.
    d. Do not co-mingle dirty and clean clothing: Can use separate bags.
    e. Launder dirty clothing after each use and dry completely in a dryer.
2. Monitor self and teammates for new lesion(s) of concern.
    a. Once identified, keep lesion(s) covered under a bandage.
    b. Show lesion(s) to a coach or trainer as soon as possible.
    c. Take care to not transfer potential lesional pathogens onto other areas of your body.
3. Avoid shaving hair on body; if this is unavoidable, trimming is preferred.

there is a chance of acquiring HSV and that it could result in lifelong recurrences. They should also be offered antiviral prophylaxis to reduce the risk of infection.

Molluscum Contagiosum

Infection with the molluscum contagiosum virus (a poxvirus) can involve any part of the body but most likely knees and elbows. Lesions are small, skin-colored papules with central indentation and can be numerous; diagnosis is usually made clinically but can be done histologically on an excised lesion. They are asymptomatic or mildly itchy and usually resolve over several months if untreated.[31] They are transmissible through direct skin-to-skin contact or via fomites such as bath sponges or towels. Treatment includes physical destruction of the lesions with sharp curette.[9] The greatest problem in combat sports athletes with molluscum contagiosum is secondary bacterial infection of traumatized lesions or recently curetted lesions. Return to competition may be considered after destruction of the lesions with covering using a gas-permeable membrane and tape.[9] Given the low burden of suffering and curable nature of this infection, it is reasonable to allow participation in untreated elite combat sports athletes, or youth athletes in high-level competitions.

Human Papillomavirus

Human papillomavirus (HPV) has many strains, and the most common manifestation in athletes is common warts. Diagnosis is clinical and based on the classic appearance of small, rough, skin-colored papules. They are transmissible primarily through direct skin-to-skin contact and possibly through fomites. Treatment consists of topical preparations such as salicylic acid, cantharidin, podophyllin, or imiquimod. Duct tape, cryotherapy, and curettage are also effective.[3] Return to play may be considered if the lesion is adequately covered during competition.[29]

Prevention of Skin Infections in Combat Sports

Primary Prevention

Primary prevention of skin infections centers on decreasing the numbers of microbial organisms on participants and their environment. Colonization of participants is minimized by universal and fastidious personal hygiene practices. Environmental contamination is minimized by effective cleaning of clothing, mats, and other equipment.[3,9,32]

Personal Hygiene

Best practices for personal hygiene begin with hand washing with soap and water or application of skin sanitizer before practice and competition.[3,33] Wearing clean clothing will protect skin from abrasions and direct transmission of potentially pathogenic organisms. Showering immediately after training decreases the number of potential pathogens on the skin.[3] If showers are not available, soap-and-water wipes are more effective than not washing at all. Clothing can serve as fomites, so clean and dirty clothing should not be intermixed.[9,32] Additionally, cosmetic shaving should be avoided because the associated skin irritation can cause skin microtrauma, or even folliculitis or dermatitis, which can then become a portal of entry for pathogens.[3,9,32]

Primary prevention with systemic treatments has been shown to be effective but this approach is not widely recommended due to concerns for potential adverse effects and drug resistance. However, it should be considered in select patients with known histories of recurrent infections.[3,22,32] See Figure 1 for a summary of primary prevention measures.

Environmental Hygiene

Environmental hygiene focuses on cleaning mats and equipment.[9,32] Daily cleaning of equipment/facility in conjunction with the practice of good personal hygiene by athletes has been shown to decrease the incidence of infectious skin conditions in athletes.[9] Studies on wrestling mats demonstrated that cleansers with residual activity (e.g., thyme oil) are more effective than those without residual activity (e.g., bleach 10%). However, this benefit could be approximated if cleaning with bleach 10% was combined with strict hand sanitizer use by all wrestlers. Additionally, cleaning mats in a backwards-mopping fashion prevented secondary contamination with soil bacteria from shoes.[33]

Secondary Prevention and Prophylaxis

The hallmark of secondary prevention is early treatment of skin infections and withholding the athlete from participation until they are deemed no longer infectious. Early recognition and treatment of infected combat sports athletes will reduce the duration of lost training time and limit development of comorbid conditions such as secondary infection.[34] Clearance recommendations for athletes vary by the pathogen and affected body part and are based on consensus opinion since empiric evidence for these recommendations is unavailable. It is widely considered prudent to prohibit athletes with infectious skin conditions from competing until effective treatment has been initiated and the risk of spread is reduced.[3,11,12] The specific treatments and return-to-participation guidelines are summarized in Table 1**.** Longstanding guidelines by the National Federation of High Schools[12] and the National Collegiate Athletic Association[11] are extremely helpful and provide an objective and defensible framework for managing these difficult decisions.

Prophylactic treatment is a prudent approach to preventing recurrent infections when the risk of reinfection outweighs the risk and burden of prophylactic medication. Risks of reinfection include the clinical burden of suffering, lost training time, and possibly forfeiture of matches. It would be heartbreaking for an athlete to be eliminated from a high-level competition due to a recurrence of a preventable infection. Scenarios in which prophylaxis is prudent include recurrent tinea corporis or tinea capitis, recurrent herpes labialis or gladiatorum, or teams with high prevalence of these conditions. This approach can reduce the frequency and duration of recurrences and reduce the risk

Table 1. Treatment and Return to Contact Sports Recommendations for Skin Infections in Combat Sports Athletes.

INFECTION	TREATMENT	RETURN-TO-SPORTS
Nonpurulent bacterial infections (not MRSA)	• Penicillin V 500mg PO QID 5-14 days • Amoxicillin 875mg PO BID 5-14 days • Clindamycin 450mg PO TID 5-14 days • Trimethoprim-sulfamethoxazole 1-2 DS Tab PO BID 5-14 days	• No new lesions for 48 hours • Completion of 72 hours of antibiotic therapy • No further drainage • No active infections
Nonpurulent MRSA infections	• TMP-SMX 1-2 DS Tabs BID • Clindamycin 450mg PO TID • Doxycycline 100mg PO BID • Minocycline 200mg PO x1 day, then 100mg PO BID	• No new lesions for 48 hours • Completion of 72 hours of antibiotic therapy • No further drainage • No active infections
Tinea corporis (tinea gladiatorum)	• Terbinafine 1% cream Topical BID 2-4 weeks • Ketoconazole 2% cream Topical QD 2-4 weeks • Clotrimazole 1% cream Topical QD 2-4 weeks • Fluconazole 150mg PO QD x 7 days • Itraconazole 100mg PO QD x 14 days • Terbinafine 250mg PO QD x 7 days	• Completion of 72 hours of antifungal therapy, or consider allowing participation with untreated lesions in elite athletes or those in high-stakes competitions • Lesions should be covered with reliable dressings
Tinea capitis/barbae	• Terbinafine 250mg PO QD 2-4 weeks • Ketoconazole 200mg PO QD 2-4 weeks • Itraconazole 200mg PO QD 2-4 weeks • Fluconazole 6mg/kg PO QD 3-6 weeks	• Completion of 2 weeks of systemic therapy, no drainage • Continued use of antifungal shampoo before practice until scalp lesions resolve
Herpes simplex virus (herpes labialis or herpes gladiatorum)	Primary infection • Acyclovir 400 mg PO TID x 7-10 days • Famciclovir 500 mg PO BID x 7-10 days • Valacyclovir 1 g PO TID x 7-10 days Recurrent infection • Acyclovir 400mg PO TID x 5 days • Famciclovir 750 mg PO bid x1 day • Valacyclovir 2 g PO BID x 1 day Suppression of infection • Valacyclovir 500mg-1000mg PO QD	• Free of systemic symptoms • No new lesions for 72 hours • Completion of 6-10 days of systemic antiviral therapy • Lesions surmounted by firm adherent crust
Molluscum contagiosum	• Physical destruction of lesions with sharp curette	• Consider allowing participation in untreated elite athletes or high-stakes competitions • Other athletes, after destruction of lesions • Treated lesions covered with gas-permeable membrane and tape
Verruca vulgaris	• Cryotherapy • Salicylic acid • Imiquimod	• Lesion should be covered • Consider allowing participation in untreated elite athletes or high-stakes competitions

of transmission to uninfected training partners or opponents.

Prophylaxis of tinea corporis is indicated in athletes with a history of the condition and risk of recurrence due to continued exposure in combat sports with skin-to-skin contact such as wrestling, MMA or submission grappling. Studies are limited in number and were all conducted in wrestlers. One small study of 22 wrestlers noted a dramatic drop in tinea corporis just with daily skin checks and a barrier cream.[35] One randomized controlled trial in 131 high school wrestlers compared placebo to fluconazole 100 mg weekly. The incidence of infection was 22% with placebo but only 6% with fluconazole, and no side effects were reported in the treatment group.[36] Another study in a larger cohort of high school wrestlers showed that treating with fluconazole 100 mg daily for three days at the start of the season and again for three days 6 weeks into the season reduced the incidence from 67% in the year prior to treatment, to 3.5% in the 10-year period of treatment. Ninety percent of the wrestlers (375) on two teams participated. No adverse effects were reported.[37]

Prophylactic treatment of HSV infection is also of great interest since the burden of suffering for this infection can be high in combat sports athletes, with a potential for lifelong recurrences. Two small studies[30,38] and one large study[22] have shown that valacyclovir 1,000 mg per day during a wrestling season or "camp" markedly reduces the incidence of herpes gladiatorum in wrestlers about 85% and is effective in wrestlers with or without a prior history of herpes infection. We endorse this approach because viral shedding can also occur in asymptomatic athletes with a history of HSV infection. Physicians taking care of teams should strongly consider this prophylactic technique.

Discussion

The authors acknowledge that there is limited published literature regarding the treatment and prevention of skin infections in combat sports. Hence, much of this statement is an extrapolation of current recommendations from other organizations (NFHS, NCAA) and incorporates both current best practices in combat sports as well as the collective expertise of the ARP membership, who have provided medical coverage of athletes in boxing, MMA, wrestling, judo, jiu jitsu, taekwondo, and other combat sports over many years.

Skin infections continue to be a significant cause of morbidity and lost training and competition days. Combat sports athletes—especially wrestlers and other grapplers–are at high risk due to vigorous and frequent skin-to-skin contact. This document serves as a brief review of the most important infections and the important principles of treatment and prevention so that morbidity and training restriction can be minimized though evidence-based or best-practice guidelines.

It should be emphasized again that primary prevention is paramount in importance. Coaches, athletes, athletic trainers and training or competition facility managers should be educated on prudent sanitation practices and adhere to them consistently. Practices such as personal hygiene and facility sanitation can greatly reduce the incidence of infections.

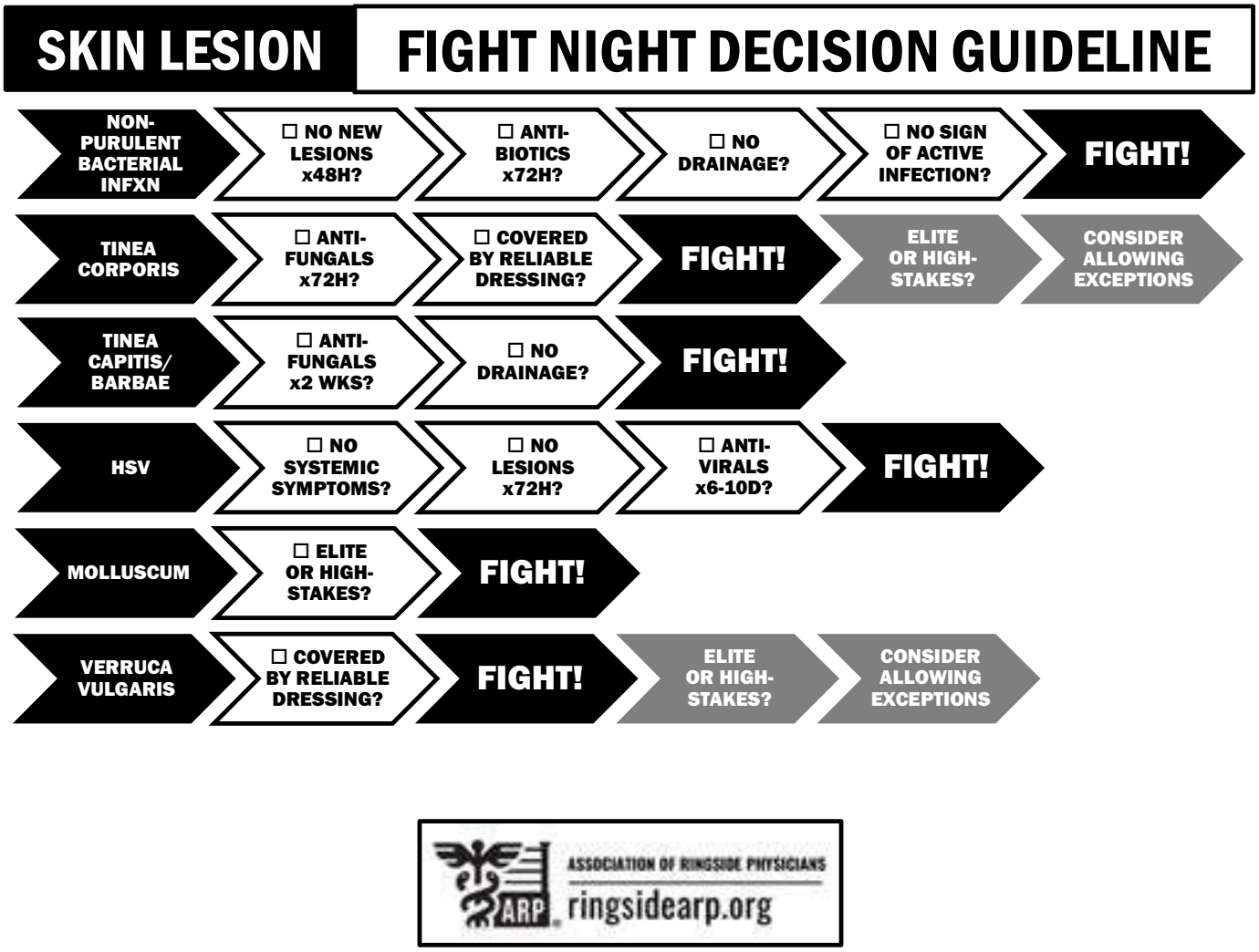
When infections occur and are identified, rapid initiation of treatment and isolation of the athletes from training and competition are important to minimize morbidity and prevent further spread. A quick-reference "fight night" decision tool is provided in Figure 2.

Consultation with the NFHS or NCAA skin disease guidelines for return to play are helpful and highly recommended. However, as mentioned above, deviation from these guidelines is reasonable for conditions with a relatively low burden of clinical suffering and high rate of cure with well tolerated treatments, e.g., tinea corporis, common warts, and molluscum contagiosum. This could be considered for high school state or national wrestling competitions, collegiate wrestling competition at the national and international level, and for any professional athlete competing in combat

sports, given the high stakes of the competition and the low risks of the conditions. We believe athletes with these conditions should be allowed to compete regardless of having completed a full course of treatment. However, they should cover as many lesions as possible and be advised to begin treatment as soon as possible.

In the case of herpes gladiatorum caused by HSV, using a lengthier period of isolation from contact sport during oral antiviral treatment than recommended by NFHS/NCAA should be considered. Their 120-hour (5-day) period of treatment before resuming contact sports likely comes from studies of genital herpes.[39] Though studies in herpes gladiatorum are very limited, one study looking at duration of viral during oral antiviral therapy in wrestlers[30] showed that it took 6 to 10 days (average 8.1) for viral shedding from lesions to resolve. Therefore, the 5-day restriction period recommended by NFHS/NCAA is likely too short to prevent spread of the virus, so the ARP recommends a period of 6 to 10 days of oral antiviral treatment prior to resumption of combat sports. This should include all sports with a chance of skin-to-skin contact with the affected area. This range could be at the low end of 6 days in elite athletes at high-level competition, or at the high end of 10 days in non-elite athletes in lower-level competition or in elite athletes being restricted from contact training. Informed consent of the athlete (and guardians) and clinical judgment of the medical professional should be used to arrive at a prudent return-to-sport decision.

Figure 2. Quick-Reference "Fight Night" Decision Tool.



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Prevention of new and recurrent infections of herpes gladiatorum is markedly reduced with the use of daily oral antiviral suppression therapy, both in uninfected wrestlers and those with a history of infection.[22,30,38] Valacyclovir 1000 mg daily is the recommended dose and is safe and well tolerated. Given the risk of transmission during both asymptomatic periods and during outbreaks, risk of lifelong recurrences if contracted, and the risk of outbreaks curtailing training and competition, prophylaxis for elite athletes is a reasonable and attractive option. Education of athletes and coaches about this approach is recommended.

Qualifying Statement

This Position Statement (full manuscript) was approved by the ARP Board of Directors on June 2, 2023. These guidelines are recommendations to assist ringside physicians, combat sports athletes, trainers, promoters, sanctioning bodies, governmental bodies, and others in making decisions and setting policy. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints and are not intended to replace local commission laws, regulations, or policies already in place. In addition, the guidelines developed by the ARP are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide the basic recommendations that are supported by synthesis and analysis of the current literature, expert and practitioner opinion, commentary, and clinical feasibility.

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Incidentally detected acute leukemia in a professional boxer applying for licensure to fight-never forget the humble CBC: a case report

Nitin K Sethi, MD, MBBS, FAAN
(Email: sethinitinmd@hotmail.com)

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Abstract

To determine fitness to fight, professional boxers undergo a number of tests at the time of the initial licensure and periodically thereafter. Mandatory required are not standardized and vary from athletic commission to commission. The case of a professional boxer who was incidentally detected to have acute leukemia on complete blood count (CBC) test is presented. CBC is not a costly test even if a boxer does not have insurance. The humble blood count test can reveal diseases before clinical manifestation. The value of this diagnostic powerhouse should be recognized, and all professional combatants should undergo this test at time of initial licensure and periodically thereafter.

Case Report

A-30-year-old professional boxer applied for licensure to fight. As part of application for licensure medicals including CBC was presented to the attention of the Commission's medical team. CBC showed markedly elevated WBC count at 180 x10E3/uL (normal range=3.4-10.8), Hb/Hct=10 g/dL/30.4 % (normal range=13.0-17.7)/37.5-51). Platelet count was within normal limits at 311 x10E3/uL (normal range=150-450). Differential showed blast cells (3) (reference interval=0), metamyelocytes (6) (reference interval=0), myelocytes (16) (reference interval=0), promyelocytes (3) (reference interval=0) and absolute neutrophils 111.6 x10E3/uL (normal range is 1.4 to 7), PT/PTT/INR were 11.2/30/1.0. The blood picture of leukocytosis with myeloid left shift and few blasts was consistent with a myeloproliferative disorder such as leukemia. To rule out the possibility of laboratory error, repeat CBC was requested and it was unchanged. When questioned, the boxer denied any constitutional symptoms such as anorexia, fatigue, weight loss, fever, headache, bone and joint pain. He was denied license to fight on medical grounds and advised to make an appointment to see his primary care physician and a hematologist-oncologist.