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Review Article

Skin and sports

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Abstract This review focuses on conditions associated with sports, which directly or indirectly affect athletes' health and their performances during competitions. These include wide spectrum of dermatoses ranging from infections, frictional and trauma induced dermatoses, UV light and performance enhancing drugs related problems.

Keywords
Sports dermatoses, infections, frictional dermatoses.

Introduction

Sports and progress of nations go hand in hand. The interest in sporting activities has increased in Pakistan in recent years and many young men and women are participating in national, regional, Asian, world, Olympics and commonwealth games. In United States more than seven million athletes at high school and college level participate in sports every year.[1] There are many cutaneous problems which are associated with these physical activities and these are known as sports dermatoses. A diagnostic and therapeutic knowledge of various sport-related dermatoses results in prompt and appropriate treatment of skin problems in athletes.

Sports-related diseases are classified in various ways. Dermatoses can be caused directly or indirectly by sports (**Table 1** and **2**). We here, describe these dermatoses by dividing them into various categories according to their etiology (**Table 3**).

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Table 1 Dermatoses caused by sports.

Tennis toes
Jogger's nipples
Talon noir
Tache noir
Swimmer's xerosis
Herpes gladiatorum
Corns
Friction blisters
Piezogenic pedal papules
Athlete's nodules
Hematomas
Acne mechanica

Table 2 Dermatoses aggravated by sports.

Photodermatoses
Cholinergic urticaria
Epidermolysis bullosa
Fungal, viral and bacterial infections
Atopic dermatitis
Psoriasis and lichen planus
Cutaneous malignancies

Table 3 Dermatoses according to etiology

Skin infections
Frictional dermatoses
Trauma induced dermatoses
Dermatoses due to exposure to ultraviolet radiation
Thermal injuries
Water-related dermatoses
Dermatoses due to use of performance enhancing drugs
Aggravation of pre-existing dermatoses
Inflammatory conditions

Skin infections

There is a high prevalence of cutaneous infections among athletes due to their interaction with other athletes and with the environment. Sweating, close skin-to-skin contact, occlusive clothing, equipment sharing and open wounds contribute to the spread of diseases.[1,2] These cutaneous infections can affect exercise programs of athletes by causing discomfort.

Cutaneous infections include fungal, bacterial, viral, atypical mycobacterial and parasitic infections. Fungal infections include tinea capitis, corporis, cruris, faciei, pedis and pitryasis versicolor.[3] The cause of fungal infections is hot weather, moisture and close skin to skin contact.[4] These are seen commonly among football players, basketball players, swimmers and runners.[5-8] Tinea corporis gladiatorum is another term for fungal infections as they are more common among wrestlers.[5]

Bacterial infections affecting atheletes include impetigo, folliculitis, furunculosis, erysipelas, cellulitis, erythrasma, pitted keratolysis, hot tub folliculitis and swimming pool granuloma.[9] Athletes participating in sports including football, basketball, volleyball, wrestling, weight lifting and running are more prone to bacterial infections.[1,2] Skin-to-skin contact in football, basketball and wrestling while fomites in running, weight lifting and volleyball are important causes of spread of infection.[1,9]

Atypical mycobacterial infections have also been reported among athletes of water-related sports.[1]

The common parasitic skin infections include scabies and lice infestations whereas cutaneous larva migrans and myiasis occur rarely among athletes.[1]

Viral infections common among sportsmen are warts, herpes gladiatorum, herpes labialis, herpetic whitlow and molluscum contagiosum.[1,2] These occur due to skin to skin contact and use of fomites. Athletes may acquire herpes simplex virus (HSV)-1 from other athletes in karate, wrestling and rugby. Among skiers, cricketers and golfers intense exposure to ultraviolet radiation may reactivate HSV.[1] Herpes gladiotorum is commonly acquired among wrestlers and rugby players from other players.[1] Herpes infection is seen as grouped vesicles with erythema involving head, neck and extremities.

Warts, caused by human papillomavirus (HPV), are seen in high proportion among athletes.[10] Skin-to-skin contact, sharing equipment or going barefoot in the showers puts the athletes at risk.[11] There is an increased incidence of the disease among swimmers. The common sites of warts are hands and soles.[12]

Molluscum contagiosum, caused by a poxvirus, has the similar mode of spread as warts, as well as, tight-fitting athletic clothing. Lesions are well-defined, white papules with a central indentation but lesions without central umbilication can also be seen.[13] To prevent these infections, players should avoid sharing clothes, equipment and towels.

Frictional dermatoses

These include corns, friction blisters, athlete's nodules, jogger's itch, jogger's nipples, piezogenic pedal papules and acne mechanica due to occlusion of the skin, pressure and frictional rubbing.[14] It usually occurs in areas covered by protective gear in contact sports. Runners, football players, riders and cricket players are usually affected. Protective headgear worn in hockey and wrestling may create acne mechanica.[15] Occlusive synthetic clothing of gymnasts, plastic benches of weight lifters, the

golf bag shoulder strap, and the cradling of the shot against the neck in shot putters may also produce acne mechanica. Lesions occurring at the sites of friction or repeated trauma among players are called athlete's nodules which are collagenous masses about 0.5-4cm in size, single and skin coloured. Athlete's nodules are seen among surfers on their feet known as "surfer's nodules", boxers on their knuckles also known as "knuckle pads" and among footballers on their ankles.[1]

Similarly due to recurrent friction or irritation from fabrics against the chest in runners painful, erythematous, fissured erosions develop on nipples and areolae. This condition is called jogger's nipples.[16] Small 2-5 mm papules on the sides of feet seen on standing up are named piezogenic pedal papules. These develop due to herniation of subcutaneous fat into dermis and are located on medial or lateral aspects of heels. Heel cups in shoes and rest help reduce the pain.[16,17] Frictional injuries to hair can also be seen e.g. balancing beam alopecia seen in gymnasts and aquaslide alopecia in water sports in which patches of hair loss can be seen on lateral sides of thighs, the site which comes in contact with the slides in water sports.[18]

Trauma-induced dermatoses

Tennis toe or jogger's toe, talon noir (black heels), tache noir (black palms), dystrophic nails and auricular hematomas are trauma induced cutaneous lesions seen with different sporting activities such as running, tennis, golf, basketball and wrestling.[19,20] Sudden movements in the sports such as tennis, squash and basketball lead to shearing forces which rupture the blood vessels in the heels leading to the appearance of black heels. Melanotic lesions can be pared off but can also resolve spontaneously in 2-3 weeks.[21] Toenails of the athletes also get injured in games like badminton, tennis and squash and subungual hematoma develops usually under big toenails. In football players, the second and third toes while fourth and fifth toenails in runners are affected. Treatment and prevention include trimming the nails and wearing shoes with adequate toe space.[4,8,15]

UV radiation-induced dermatoses

Prolonged exposure to sunlight exposure in outdoor games leads to benign and malignant changes in skin, which include photosensitivity, aggravation of photodermatoses, cutaneous malignancies such as malignant melanoma, basal cell and squamous cell carcinomas. Golfers are particularly prone to these diseases. Sunburns are also seen among athletes who are exposed to the sun for a long period of time as golfers, cricketers, mountain bikers, long distance runners, swimmers and surfers.[1,17]

Thermal injuries

Sports in which players are exposed to extreme cold e.g. skiing, ice-skating and horse riding are associated with specific dermatoses such as frost bite, trench foot and perniosis.[22] Erythema ab igne is seen among athletes who use heating pads frequently to treat sports related injuries.[2,14]

Water sports-related dermatoses

Athletes participating in water sports suffer from various dermatoses such as swimmer's xerosis, swimmer's itch, hot tub folliculitis, bikini's bottom, jellyfish sting, and allergic contact dermatitis. Loss of moisture from the skin due to chemicals in the water, hot showers and use of hot tubs causes xerosis. Green hair, due to deposition of copper found in water, in light hair individuals is also reported.[18] Seabather's eruption is an intensely pruritic vesiculopapular or urticarial eruption due to larvae of thimble jellyfish trapped in areas covered by the

swimming suit. Jellyfish sting or Portuguese man-of-war sting presents with urticarial lesions in linear distribution in sports played on beaches. Prolonged wearing of damp swimwear during competitions can lead to development of nodular eruption over inferior gluteal region due to *Staphylococcus aureus* and streptococcal infection known as bikini's bottom. Pseudomonas infection can present with follicular erythematous papules and pustules in people using hot tubs and whirlpools. Tender nodules on the soles of feet of children using wading pool are due to Pseudomonas infection. Swimming pool granuloma or fish tank granuloma due to *Mycobacterium marinum* commonly occurring in aquarium cleaners can present in fresh or salt water sports.[18,19,20]

Dermatoses due to performance enhancing drugs

The use of drugs among athletes to enhance performance has become quite common in this competitive era. Anabolic steroids are used by body builders and athletes to increase muscle mass, strength and stamina for training but their continuous use leads to various cutaneous and systemic side effects.[23] Cutaneous manifestations usually precede systemic effects due to which the role of dermatologist becomes very important in detecting and eventually preventing systemic side effects of these drugs. Anabolic steroids are derivatives of testosterone used orally or by intramuscular injections. They stimulate the growth of the sebaceous glands, resulting in an increase in the skin surface lipids and *Propionibacterium acnes* population. Athletes present with acne, abscesses, androgenic alopecia, striae and keloids.[23] Photosensitive reactions can occur due to inadvertent use of other medicines e.g. tetracyclines, thiazide diuretics, sulfonamides, griseofulvin etc. by the athletes.[1,24]

Aggravation of pre-existing dermatoses

Psoriasis, vitiligo and lichen planus can present with Koebner's phenomenon in areas of skin injury such as abrasions. During hot summer months epidermolysis bullosa of Weber-Cockayne type is worsened. Cholinergic urticaria exacerbates with heavy physical exercise. Cycling and jogging can aggravate vibratory angioedema. Atopic dermatitis gets worse during winter months.[1,18]

Inflammatory conditions

Various inflammatory conditions are also seen among sportsmen which include allergic contact dermatitis, irritant contact dermatitis, pruritus, urticaria, exercise-induced angioedema and anaphylaxis. Allergic contact dermatitis due to swim gear presents with erythema, pruritus, vesicular eruption and crusting on contact sites. The most common cause could be rubber allergy or glue. Tight swim goggles can cause contact purpura.[1,2]

Conclusion

Skin problems are very common among athletes. In view of these cutaneous associations of sports, the onus lies on dermatologists and sports medicine clinicians alike for early treatment and prevention of skin diseases among athletes.

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