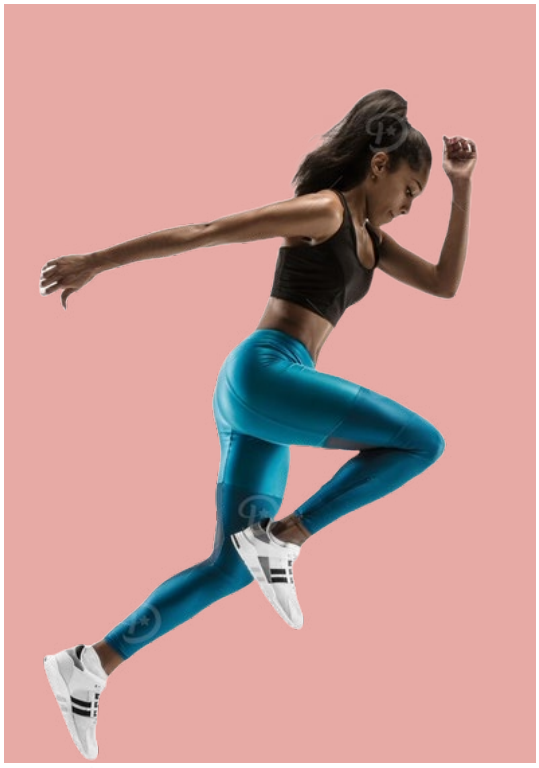
Sports Pharmacy
DECODING THE SCIENCE OF ELITE HUMAN PERFORMANCE
ISSUE 8 | OCTOBER 2023
www.sportsrxnews.com

ATHLETE AND SKIN HEALTH

OFFENSIVE STRATEGIES FOR SKIN HEALTH



Common Skin Conditions in Athletes

Beauty from the Inside-Out: Top 5 Supplements to Up Your Skin Game

When the Skin Bites Back: Handling Common Skin Infections in Athletes

MEET THE EDITORIAL BOARD

Dr. Brandon Welch, PharmD.

Dr. Jessica Beal-Stahl, PharmD.

Dr. Matthew Liaw, PharmD.

Dr. Kristal Potter, PharmD.

Sean Casey, RD, CSCS

Robert Nickell, RPh.

Contents

Atopic Dermatitis in Sports

By Marissa Mauricio, PharmD, MBA, CPh
Clinical Wellness Pharmacist

AUTHORS BIO:

Marissa currently serves as a Clinical Wellness Pharmacist at Baptist Health South Florida. Prior to her current role, she completed the ASHP Executive Fellowship in Association Leadership and Management. Dr. Mauricio graduated with her Doctor of Pharmacy and Master of Business Administration from Nova Southeastern University (NSU) in Davie, Florida. She previously obtained her Bachelor of Science degree in Allied Health from Texas A&M University. Dr. Mauricio has held a number of leadership roles, and has contributed to many health and wellness initiatives such as the ASHP Well-Being Ambassador Program. She is also a part-time lifestyle and wellness content creator who shares wellness resources and information on her platform.

Pharmacists, especially sport and community pharmacists, are often the first to see and consult for treatment suggestions for dermatologic conditions. Dermatological conditions account for 8.5% of high school and 20.9% of college sports-related conditions.[5] It is vital for pharmacists to recognize these skin conditions, understand treatment options and the implications of specific skin conditions that can result from engaging in sports. In an online study by the Eczema Foundation, 92% of children participated in a sports activity at school or with a club. However, this figure fell to 78% among children with atopic dermatitis.[6] This is because physical activities can cause discomfort in children with the condition, making it challenging to keep going.

Atopic Dermatitis in Sports

Atopic Dermatitis, more commonly known as eczema, affects more than 31 million Americans .[1] While the exact cause of the condition is unknown, eczema can develop during childhood or a adulthood. Eczema can range in severity from mild to severe. Sun, stress, sweat, sand, saltwater, and rapid temperature changes can trigger "flare-ups" causing an athlete's skin to become itchy, bothersome, and potentially affect performance. Pharmacists have an opportunity to manage eczema for athletes so they can focus on excelling in their sport.

Let's get under the skin on eczema

Eczema is an inflammatory skin condition that causes the skin barrier to become dry and itchy. It is not contagious, but it is associated with environmental triggers and potentially genetics. The most common symptoms of eczema are itchiness, dryness, scaly patches, oozing or crusting, and inflamed or discolored skin. It often appears red in lighter-skinned individuals, whereas people of color may experience eczema as ashen skin, grey skin, and darker brown or purple in color.[1] Flare--ups can last from days to weeks and can progress from rash to potentially becoming infected. Understanding the symptoms and triggers of eczema will allow athletes to address their flare-ups promptly. Moisturizers, antihistamines, pain relievers, topical steroid creams, corticosteroids, and other prescriptions are potential treatment options for atopic dermatitis. A daily skincare routine and prepping the skin for sport specific conditions will create a healthy skin barrier and prevent unwanted flares.

Athletes constantly competing outside and in various climates may find it challenging to control their eczema. Constant sweating, friction, and exposure to

> Prioritizing skin health will reduce irritation and provide relief for athletes during exercise and competition.

new environments can cause flare-ups of rashes and dry skin. Swimmers with eczema may often experience a burning or stinging sensation from salt water or chlorine, which could affect both mental and physical performance. Itch is the most burdensome symptom of atopic dermatitis, followed by skin redness and sleep loss.[2] Additionally, eczema has a psychological impact on athletes, including self-esteem and mental resilience. Eczema does not have a one-size fits all solution and can ultimately take a toll on athletes who are uncontrolled.

Awareness and prevention is key

It's critical for athletes who deal with eczema to develop a consistent skincare routine that fits their lifestyle. Eczema typically presents with dry skin, so it's essential to hydrate, use products that bring moisture back into the skin, and protect the skin barrier from further damage. Keeping the skin cool will also minimize irritation and reduce itch. Athletes can utilize a cooling towel or cold compression to calm the skin and help recover. Exercise can trigger frenzied scratching as the skin surface temperature soars.[3] To help regulate body temperature, athletes can implement warm-up exercises to help their body gradually get warmer and take breaks to rest, rehydrate, and cool down. It's also important to avoid extremely hot temperatures, like a hot bath or shower after exercising, as this may further inflame and irritate the skin. Additionally, wearing loose-fitting 100% cotton clothing may be more comfortable on the skin compared to sweat wicking clothing that may irritate eczema. If available, breathable fabrics that don't rub or scratch skin would be preferred during exercise.

Over 55% of adults with moderate to severe atopic dermatitis report inadequate disease control.[2] It's essential that athletes seek professional help from a dermatologist for severe eczema. Dermatologists can provide treatment

plans and prescription medication if needed. Those looking for over-the-counter (OTC) solutions can consult a pharmacist for help with product selection and creating a personalized treatment regimen. There are many safe and effective options to choose from that can help with eczema symptom relief for itch, pain, irritation, or rash. All athletes should implement stress management techniques, no matter the level of competition. There is a correlation between eczema and stress, so having stress management strategies can prevent future flares and ease the mind. Implementing pre-competition approaches for good sleep hygiene will also help athletes get the rest and recovery their body and mind needs to perform at their best.

Treatment of Strategies

Treatments for athletes with eczema depend on the severity, lifestyle, OTC options, and available prescriptions. Antihistamines are often recommended to help with inflammation and itch. Some antihistamines also contain sedatives, which may help with sleep. OTC pain relievers such as nonsteroidal anti-inflammatory drugs (NSAIDs) and Tylenol may help athletes with burning, pain, and inflammation caused by eczema. Low-dose hydrocortisone may provide some relief, but if symptoms persist it's recommended to see a healthcare provider. One of the most prescribed medications for eczema is a topical corticosteroid to reduce itching and inflammation. Once inflammation is under control, reduce or stop steroid use per your physician's instructions.[4]

Other medications that might be prescribed include JAK inhibitors, topical calcineurin inhibitors, phosphodiesterase-4 (PDE4) inhibitors, biologics, and immunosuppressants.

While exercising can potentially upset skin, eczema shouldn't stop athletes from partaking in their sport. Prioritizing skin health will reduce irritation and provide relief for athletes during exercise and competitions. Understanding how to manage flares and knowing the triggers will help athletes avoid exposure and worsen their condition. OTC creams, pain relievers and prescription medication(s) as prescribed will help treat eczema and its various symptoms. Consulting with a healthcare professional will provide the best personalized therapy and utilizing resources like the National Eczema Association will offer more guidance on managing this condition. Skincare is a role that pharmacists can support athletes with eczema in developing a skincare routine, managing their stress, and recovery.

References:

1. *What is eczema?*. National Eczema Association. (2023, September 26). https://nationaleczema.org/eczema/
2. *Eczema stats*. National Eczema Association. (2023, September 5). https://nationaleczema.org/research/eczema-facts/
3. Fuller, J. (2021, August 13). *Eczema and Exercise*. National Eczema Association. https://nationaleczema.org/blog/eczema-exercise/
4. *Available Eczema Treatments*. National Eczema Association. (2023, February 22). https://nationaleczema.org/eczema/treatment/
5. Pujalte GGA, Costa LMC, Clapp AD, Presutti RJ, Sluzevich JC. More Than Skin Deep: Dermatologic Conditions in Athletes. Sports Health. 2023 Jan-Feb;15(1):74-85. doi: 10.1177/19417381211065026. Epub 2022 Jan 17. PMID: 35034516; PMCID: PMC9808835.
6. https://www.pierrefabreeczemafoundation.org/ (October 4, 20222)
7. McCleary, K. K. *More Than Skin Deep 'Voice of the Patient' Report*. (2020).
8. Maarouf, M. et al. Pain and Itch are Dual Burdens in Atopic Dermatitis. Dermatitis 29, 278-281 (2018).
9. Silverberg, J. I. et al. Patient burden and quality of life in atopic dermatitis in US adults: A population-based cross-sectional study. Ann. Allergy Asthma Immunol. 121, 340-347 (2018).

DERMATOLOGICAL SKINCARE SOLUTIONS FOR ALL PATIENTS

CeraVe®
DEVELOPED WITH DERMATOLOGISTS

LA ROCHE-POSAY
LABORATOIRE DERMATOLOGIQUE

#1 DERMATOLOGIST* & PHARMACIST† RECOMMENDED SKINCARE BRAND

FASTEST GROWING SKINCARE BRAND IN THE US**

*IQVIA, ProVoice Survey, rolling 12-month data as of March 2023.
†Based on an independent national survey of pharmacists.
**Among top 25 brands based on dollar sales reported by NielsenIQ for the "Total Skincare" category, for the 52W ended 7/17/23, vs. same period in 2022.

Common Skin Conditions in Athletes

By Dr. Brandon Welch, Pharm.D., M.S.(c)

AUTHOR BIO:

Dr. Brandon K. Welch is an experienced licensed wellness pharmacist that holds his doctorate in pharmacy from the University of South Florida and his bachelor degree in biomedical sciences with a focus in biochemistry. He is the wellness pharmacist for Baptist Health where he works collaboratively with the Miami Dolphin's and Florida Panther's team physician to help enhance athletic performance and reduce risk of illness. His passion in connecting metabolic health with human performance led him to pursue his Master's degree in physiology and kinesiology with a concentration in human performance and athletic development. His expertise lies in functional training, metabolic health, sports nutrition, sports medicine, and sleep therapy. He utilizes science based medicine and literature to help maximize his clients training performance and daily lifestyle. He's worked with several clients, helping them lose weight, improve performance, improve their sleep cycle, muscle building, and appropriate nutrient supplementing.

Strength. Speed. Endurance. Nutrition. Those are often the first things that come to mind when thinking of top-performing athletes. But what about skin health?

Skin is our body's largest organ, and skin is both resilient and sensitive. The combination of friction, sweat, equipment, gear, hygiene, and external factors increases the risk of dermatological skin conditions in athletes. Ask any athlete who has experienced acute or chronic skin inflammation or infection, and they'll attest to how it hinders performance.

Let's dive in and explore some of the most common conditions athletes are at risk for.

Sport-Specific Skin Infections and Disorders

Understanding what skin disorder risks each sport poses empowers both a proactive approach and a swift response.

The most common injuries afflicting the athlete affect the skin. The list of sports-related dermatoses is vast and includes infections, inflammatory conditions, traumatic entities, environmental encounters, and neoplasms. It is critical that the sports physician and sports pharmacists recognize common and uncommon skin disorders of the athlete.

Beyond sport-specific risk factors, environmental factors increase the likelihood of sports dermatoses. This includes locker rooms, benches, buses, playing in heat and humidity, and any other factors that create warm and moist environments for fungus and bacteria to thrive[1]. Moist environments don't just accelerate the spread of bacteria, but they increase the likelihood of skin breakdown.

The skin conditions covered in this article aren't exclusive to athletes, but athletes are at a higher risk. Risk isn't only higher due to athleticism, but because many athletes adopt the "no pain, no gain" mindset. They play through the pain and irritation[2], often to their own detriment.

Athletes will likely be advised to pause group training until their virus or bacteria are no longer contagious. They will also need to make adjustments to their daily hygiene routine until their symptoms subside. This may include washing their sheets more frequently and only using towels at home once before laundering. Locker room towels should be laundered after every use.

Some of the most common viruses and bacteria in high-contact sports include herpes simplex virus, impetigo contagiosum, and boils.

Herpes Simplex Virus

The risk for herpes simplex virus (HSV) is higher in wrestling[3] and rugby[4]. Herpes doesn't just appear on the face as cold sores but can occur anywhere on the body. They present as a series of small fluid-filled blisters. When the blisters seep, they may open into sores as they heal. Herpes is highly contagious and must be treated with an antiviral such as valaciclovir or famciclovir. There is no cure for herpes, so there's a likelihood of recurrence.

Impetigo

Impetigo is a bacterial infection caused by streptococci and staphylococci. It's common in high-contact sports such as wrestling, football, and rugby[5]. Impetigo looks like a red sore. As it heals, the sore will open and leak clear fluid or pus. It will scab over, but the scab doesn't present like typical scabs as it's yellow and crusty. Impetigo can be treated with either oral or topical antibiotics, including mupirocin, dicloxacillin, or cefalexin.

Boils

Another bacterial infection caused by streptococci and staphylococci is furunculosis (aka. boils) of the hair follicles. Approximately 22% of wrestlers[6], 25% of all football players, and 20% of basketball players[7] develop boils at some time. Boils present as a singular red, swollen, and painful bump on the skin. The skin around may also be swollen and red or purple. They can form anywhere on the body that hair grows. In athletes, boils are most common on the scalp, armpits, groin, and buttocks. Treatment may include any combination of a heat compress, keeping it clean and dry, and reapplying gauze while it's still draining. For accelerated healing or if symptoms persist an antibiotic may be required.

Infection	Treatment	Prophylaxis
Tinea corporis gladiatorum	Fluconazole (100mg qw)[8]	Fluconazole (200mg qw),[8] itraconazole (400mg q2w)[3]
Herpes gladiatorum	Famciclovir (250mg tid),[9] Valaciclovir (1g bid)	Valaciclovir (500mg od)[10]
Impetigo	Mupirocin (bid), Dicloxacillin (500mg tid), cefalexin (500mg tid)[11,12]	None
Furunculosis	Mupirocin (bid), Dicloxacillin (500mg tid)[11,12]	None
Cutaneous larva migrans	Thiabendazole (occluded qhs),[13] Ivermectin (12mg once)	None

bid = twice daily; **od** = once daily; **qhs** = at bedtime; **qw** = every week; **q2w** = every other week; **tid** = 3 times daily.

The Occupational Hazard of Friction

Whether recreational or occupational, each sport requires a series of repetitive movements. When speaking of skin, the friction caused by day-to-day training can lead to redness and inflammation. If not addressed quickly, symptoms can evolve from minor to severe the same day.

Blisters, calluses, corns, and chafing are all examples of mechanical skin disorders[8] created by repetitive pressure, friction, and vibration. This includes blisters from tennis shoes, pitcher's mitts, and other equipment. Corns on the feet from tight ballet pointe shoes. Thigh, inner arm, and nipple chafing from running. Callused layers of skin from weight training, gymnastic rings, and parallel bars.

The frequency of these disorders can be minimized with athletic apparel, gloves, and topical tapes, creams, and lubricants designed to reduce friction. Ideally, anti-friction treatments should be applied before friction occurs, or at the onset of redness. If chafing or blisters occur, immediate treatment is required to keep skin clean and dry; and to minimize the risk of infection.

Hygiene Only Goes So Far

There are many hygienic practices athletes must adopt. Wearing breathable and moisture-wicking

There are many hygienic practices athletes must adopt. Wearing breathable and moisture-wicking clothing. Changing clothing mid-training on days of heavy perspiration.

clothing. Changing clothing mid-training on days of heavy perspiration. Showering immediately after practice. Always wearing shoes in the locker room. Presoaking sweaty clothing in vinegar and baking soda; 1 gallon of water mixed with 1 cup of both white vinegar and baking soda. Wash athletic apparel promptly after every use and ensure they dry fully.

These practices are essential, but skin disorders in athletes aren't a sheer matter of hygiene.

Intense Training Equals Intense Perspiration

No one loves to talk about it, but we all perspire. Sweat performs a vital role in maintaining body temperature, but it's also a primary driver in several dermatological skin conditions. Athletes train several hours a day, 5 or more days a week. They aren't just perspiring from their armpits, but also their groin, back, chest, feet, and full body. This presents a challenge because skin is at its best when it's dry.

Chronic perspiration increases the risk for miliaria sweat rash. This itchy rash is formed from blocked sweat glands and looks like a series of small bumps. If not treated promptly, this condition can progress to miliaria rubra, which occurs when the sweat glands open, becoming red, inflamed, and prickly.

Miliaria is common, affecting approximately 25% of all athletes[9].

The Other Acne

Hormonal imbalances are a common cause of acne at any age, particularly in high school and college-aged athletes. However, there are many types of acne and causes of acne. Some athletes struggle with acne mechanica[10] (aka. body acne). Acne mechanica is caused by a combination of trapped heat, pressure, and friction. It includes both puss-filled acne and cystic acne that develops underneath the skin.

The back is a common place for all athletes to develop acne mechanica, but the location can be sport-specific. Cyclists may have acne where their helmet touches their head. Football players may develop acne underneath their shoulder pads, helmet, and chin strap. Athletes who weight train may develop acne underneath their weightlifting belt.

Athletic acne can be frustrating and difficult to eliminate, as the trigger is likely to be ongoing. Wearing natural fibers, layering moisture-wicking materials between the skin, and following the advice of a dermatologist will minimize acne of every kind.

Treatment of acne mechanica can be more difficult than that of typical acne vulgaris. Dermatology providers often recommended these treatments:

- Salicylic acid, a beta hydroxy acid (BHA) that exfoliates the skin and helps prevent and treats blocked pores.
- Benzoyl peroxide, a topical acne treatment that kills bacteria, unclogs pores, and helps with inflammation.
- A gentle facial cleanser or acne body wash (avoid scrubs and rotating brushes).

Treatment of acne mechanica can be more difficult than that of typical acne vulgaris. Using an acne medication with salicylic acid often works well to clear this type of acne. Salicylic acid helps unclog pores.

Quick tips to help prevent acne mechanica:

1. Wear loose-fitting clothes whenever possible.
2. Reach for moisture-wicking fabrics with the ability to quickly absorb sweat.
3. Place clean, soft padding between your equipment and skin. For example, you can use memory foam shoulder pads for your backpack's straps which can minimize rubbing and skin irritation.
4. Disinfect your athletic gear and equipment before use.
5. After workouts, shower and change into clean clothes
6. Have your glasses adjusted to cause less pressure on certain parts of your face

Jock Itch Isn't Gendered

Male athletes are often the first that come to mind when we think of the fungal infection (tinea cruris) jock itch[11]. However, athletes of every gender can develop jock itch. Jock itch is most often caused by tight clothing that traps heat and moisture. This red and itchy rash is most common on the groin, inner thighs, and buttocks. It can also develop under the armpits, under the breasts, and under other skin folds.

Moisture-wicking underwear, sports bras, jock straps, dance belts, and plain or anti-fungal body powder reduce risk.

The Most Common Type of Ringworm

Athlete's foot (tinea pedis) is a fungal skin infection and one of the most common types of ringworm. Athletes who frequently use swimming pools, gyms, locker room showers are at higher risk of infection. It's estimated that 15% to 25% of people, including non-athletes, have athlete's foot at any given time[12]; and that up to 70% of all people will develop this fungus at some point in their lives.

One of the things that makes this fungus unique is that it can present itself as red, purple, gray, or white. The skin often looks scaly, flakey, or soggy and itches, stings, and burns. Symptoms can develop between the toes and on the bottom, top, and edges of the feet and heals. Athlete's foot is highly contagious and can spread across the foot when your feet sweat while wearing athletic shoes. Although "foot" is in the name, it spreads to other areas of the body. It's also stubborn. The longer symptoms go without treatment, the more challenging it is to resolve.

Proactive and reactive solutions include keeping feet clean and dry, wearing moisture-wicking socks, wearing breathable shoes, rotating shoes, and never walking barefoot in communal areas, using over-the-counter medicated powders that contain menthol and/or Miconazole Nitrate 2%. Once symptoms develop, resist the urge to scratch your fungal itch, as scratching increases the odds of spreading to other areas of the body—and to other people.

Inflammatory dermatitis refers to a broad range of skin irritations. When speaking of athletics, contact dermatitis is the most common. This refers to an allergic reaction to equipment, gear, and surfaces while training. Allergic reactions vary, often including localized swelling, itching, flaking, stinging, inflammation, or red or purple skin. Approximately 15% of athletes will develop contact dermatitis while training[13]. Treatment varies depending on the trigger, but once the trigger is identified avoidance is essential

When symptoms present, athletes must consider any changes to their training routine that could result in an allergic reaction. New chemicals on the playing field. Latex gloves and protective gear. A new laundry detergent or fabric softener. The rubber and rubber additives in goggles, swim caps, and neoprene. Fiberglass equipment handles. Resin and chalk for improved grip.

Some reactions occur within hours of exposure, while others can take days or consistent exposure to develop. Eliminating contact with the source may be enough to eliminate symptoms, but topical treatments such as benzocaine and lanolin may be required.

> Athletic skin infections are a reality for most hardcore athletes. Coaches and trainers impart hygienic best practices to their athletes.

Equipment	Sensitiser	Manufactured Alternative
Shoe insoles	Ethyl butylthiourea, mercaptobenzothiazole[36,38]	Polyurethane[36,38]
Wet suits, goggles	Ethyl butylthiourea[36,38]	Neoprene, polyvinyl chloride[36,38]
Underwater masks, swim caps	Mercaptobenzothiazole[36,38]	Silicone[36,38]
Athletic tape	Formaldehyde resin[38]	Paper tape, coban
Topical antiseptics/antibiotics	Benzocaine, neosporin[37]	Polysporin[37]

Knowledge is Power

Athletic skin infections are a reality for most hardcore athletes. Coaches and trainers impart hygienic best practices to their athletes. As medical professionals, we must ensure we're asking the right questions to encourage preventative measures and to identify the cause of existing conditions.

References:

1. Pujalte G, Costa L, Clapp, A, Presutti J, Sluzevich J. More Than Skin Deep: Dermatologic Conditions in Athletes. 2023 Jan-Feb; 15(1): 74–85. Published online 2022 Jan 17 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9808835/
2. Madrigal L, Robbins J, Gill DL, Wurst K. A Pilot Study Investigating the Reasons for Playing Through Pain and Injury: Emerging Themes in Men's and Women's Collegiate Rugby. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1007&context=athleticresearch
3. Stacey A, Atkins B. Infectious diseases in rugby players. SportsMed 2000; 29: 211-20
4. Becker TM, Kodsi R, Bailey P, et al. Grappling with herpes: herpes gladiatorum. Am J Sports Med 1988; 16: 665-9
5. Brenner IKM, Shek PN, Shephard RJ. Infection in athletes. SportsMed 1994; 17: 86-107
6. Lindenmayer JM, Schoenfeld S, O'Grady P, et al. Methicillinresistant Staphylococcus aureus in a high school wrestling team and the surrounding community. Arch Intern Med 1998; 158: 895-9
7. Sosin DM, Gunn RA, Ford WL, et al. An outbreak of furunculosis among high school athletes. Am J Sports Med 1989; 17: 828-32
8. Samitz MH. Repeated mechanical trauma to the skin: occupational aspects. https://pubmed.ncbi.nlm.nih.gov/4073025/
9. Guerra KC, Toncar A, Krishnamurthy K. Miliaria. https://www.ncbi.nlm.nih.gov/books/NBK537176/
10. American Academy of Dermatology Association. Is Sports Equipment Causing Your Acne? https://www.aad.org/public/diseases/acne/causes/sports-equipment#:~:text=It's%20called%20acne%20mechanica.,can%20cause%20new%20acne%20breakouts.
11. Harvard Health Publishing. Jock Itch (Tinea Cruris). https://www.health.harvard.edu/a_to_z/jock-itch-tinea-cruris-a-to-z
12. Crawford, F. Athlete's Foot. BMY Clin Evid. 2009; 2009: 1712. Published online 2009 Jul 20.
13. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2907807/
14. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9808835/

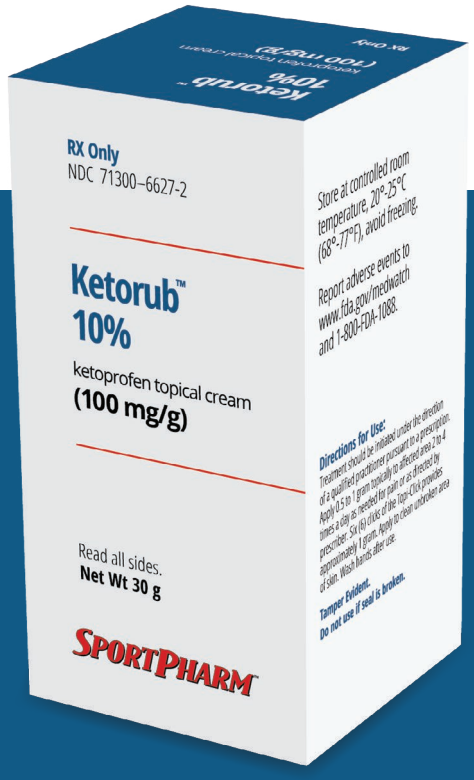
SPORTPHARM™

We Take Our Drugs Seriously.℠

Gabazone™ 10%

gabapentin topical cream

(100 mg/g)



Ketorub™ 10%

ketoprofen topical cream

(100 mg/g)

For pricing information or to set up an account contact us at info@sportpharm.pro

Nubratori RX™ Products are produced and lawfully sold in the USA, under the FDA Structured Product Listing Marketing Category #C181659 "Outsourcing Facility Compounded Human Drug Product" (Exempt From Approval Requirements). Outsourcing Facility products have not been evaluated by the FDA for pre-market approval. Pursuant to federal law, this drug is exempt from the FD&C Act: section 505 (21U.S.C. 355) (concerning the approval of new drug applications or abbreviated new drug applications).

RX Only

Medications can only be ordered by healthcare providers when it is determined the product is clinically significant over other commercially available products

FDA Outsourcing Facility

NUBRATORI RX™

Quality Innovation Patient Safety

The Athlete's Acne

By Dr. Kristal Potter, Capt, USAFR, BSC, PharmD.

AUTHOR BIO:

Dr. Kristal Potter received her B.S. in Neuroscience from Florida Atlantic University and her Pharm.D. from the University of South Florida Taneja College of Pharmacy. After graduating she served as a pharmacist in the United States Air Force at Cannon Air Force Base, where she was the Pharmacy and Therapeutics Committee Chair and championed several patient education programs. She is passionate about holistic approaches to healthcare and inspiring the next generation of pharmacy leaders. Dr. Potter currently serves as an Assistant Professor at the Larkin University College of Pharmacy and as an Air Force Reserve Pharmacist for Davis-Monthan Air Force Base.

Introduction

Almost everyone will experience acne at some point in their lives, but athletes can be especially prone to this chronic skin condition. Various additional stressors, and physical strains influence an athlete's skin integrity, particularly in those who participate in high-impact sports. The good news; acne is relatively easy to manage and a variety of pharmacotherapy options are available to suit your patient-athlete needs.

Acne Pathophysiology

Acne is a multifactorial inflammatory disease that affects the follicles of the skin. The pathogenesis involves follicular hyperkeratinization, overgrowth of *Propionibacterium acnes*, sebum production, and inflammation.[1] Management of acne is dependent on targeting these different pathologic pathways through non-pharmacologic and pharmacologic options.

Acne mechanica, also known as ""sport-induced acne"" is a specific subset of acne that can be caused by heat, pressure, occlusion, and friction from hair-bearing skin.[2] Acne mechanica often presents around areas of skin around protective equipment (helmets, chin straps, protective pads, etc.). This type of acne is commonly seen in football, hockey, and lacrosse players.

Acne also has a very high prevalence in adolescents (almost 95%), ranging from 81-95% in males and 79-82% in females.[3] The combination of excess hormones, sebum production, and athletic activity at the high school and collegiate level may precipitate a high prevalence of acne in young athletes.

Endocrinologic testing is not generally recommended for the average patient with acne but may show some benefit for athletes. For example, female athletes with hyperandrogenism and increased insulin resistance (primary features of PCOS) will inherently produce more androgens that contribute to acne pathogenesis.[4]

Nonpharmacologic Therapy

Diet

There are many myths about what dietary factors contribute to acne, but the reality is that triggers are unique, and patients will need individualized recommendations to achieve resolution of their acne and maintain remission. Popularly villainized food groups include chocolate, greasy foods, and dairy. Providers should refrain from making broad recommendations to avoid foods that may not necessarily be triggers for everyone but acknowledge that patients have specific triggers.

For example, a case report details five teenage athletes who experienced moderate to severe acne flares after initiating a whey protein supplement.[5] Their acne responded poorly to

> Most patients can successfully manage their acne with lifestyle modifications and over-the-counter therapy options.

standard pharmacotherapy, including oral antibiotics, topical retinoids, and benzoyl peroxide, but it resolved after the whey supplement was discontinued. Another report showed similar results among adult bodybuilders using whey protein supplementation.[6]

This does not mean every athlete should avoid whey supplements. Instead, providers must acknowledge that patient-athletes may be on supplements and be able to assess if any of the components could be a potential trigger. Patients may have distinctive triggers, and it is necessary to complete extensive reviews of current and new medication, nutrition, and lifestyle factors to determine what may be contributing to acne.

While dietary contributors to acne are unique, research has found several broad dietary habits that can worsen acne and success in certain dietary modifications that can alleviate acne symptoms.[7] A Western diet associated with increased dairy and a high glycemic index (GI) has been implicated in acne pathogenesis. Numerous randomized controlled trials have shown that adopting a low-GI diet can improve acne symptoms.[8,9,10]

The GI is a measurement system that ranks food on its effects on blood sugar levels.[11] Foods with a low GI value are slowly digested and absorbed, causing slower and smaller rises in blood sugar levels. A low glycemic diet includes eating a lot of non-starchy vegetables, beans, and fruits that have a lower glycemic index. It also includes substituting white rice and bread for whole-grain bread, brown rice, etc., and consuming adequate amounts of protein and healthy fats. And, of course, limiting highly concentrated sweets with high sugar content, such as ice cream or cakes.

Skin Care and Hygiene

Arguably, the most important tip for managing acne in athletes is to promote timely and consistent skin hygiene. It is recommended that athletes promptly and thoroughly cleanse their skin after any intense physical activity. For example, if a high school football player

finishes an intense practice at 5 PM but doesn't intend to shower until later at 10 PM, he should at least wash his face shortly after practice. Athletes should also be aware that rigorous (over-scrubbing) or excessive face washing (> 2 times a day) has been shown to worsen acne.[12] It is recommended that athletes wash their face twice daily with a mild cleanser. An oil oil-free mild cleanser will remove bacteria that can lead to acne and prevent the formation of clogged pores.

Athletes who spend any time in the sun should use sunscreen. A study surveying 246 athletes found that 50% of participants did not use adequate sun protection.[14] Not only does using sun protection help prevent acne, but it also decreases an 'athlete's risk of sunburn and sun cancer. It is crucial to recommend sunscreen to athletes who participate in outdoor sports and to provide education on proper sunscreen application. The average adult will need about 1 ounce (a shot glass full) to cover their entire body.[15] Patients should use sunscreen with an SPF of at least 30 or higher for adequate protection. Sunscreen should be rubbed thoroughly into the skin prior going outside or sweating and reapplied every 2 hours, or even more frequently if an athlete is sweating enough to compromise the application or engages in water sports.

Lastly, athletes should also consider using a skin moisturizer, especially if using drying acne products. Moisturizers play an essential role in maintaining healthy skin and reducing the occurrence of acne and other skin conditions.[13] A good moisturizer helps maintain 'skin's natural hydration levels and an intact skin barrier. Some facial moisturizers will also include sunscreen for additive skin protection (CeraVe®, Cetaphil®, La Roche®, etc..) The choice of a moisturizer depends on a patient's skin type (dry, oily, or combination). Patients can consult a dermatologist or a sports pharmacist about the best type of moisturizer for their skin.

Additional non-pharmacologic recommendations for athletes who experience acne mechanica include minimizing moisture and friction to the affected areas.[2] This may be achieved by wearing light, breathable, absorbent cotton or polyester. Clean, soft-padding can be placed between equipment and skin, which can minimize friction. Moisture-wicking materials, such as Nike's Dri-Fit™ line of clothing, are also highly recommended for managing acne mechanica in athletes.

Pharmacotherapy

Over-the-Counter

Benzoyl peroxide (BP) is generally a first-line recommendation for mild acne. It is also used in combination with topical antibiotics or topical retinoids for moderate acne. BP works by killing *P. acnes* through the release of free oxygen radicals. BP comes in various formulations (e.g., washes, foams, creams, gels…), and the strength ranges from 2.5%, 5%, and 10%.[1] An important counseling point for BP is that it can stain/bleach fabrics.

Topical retinoids are another first-line option for acne.[1] Topical retinoids are Vitamin A derivatives that are comedolytic and anti-inflammatory. Adapalene (Differin) is available OTC and in prescription strengths, making it useful for patients needing to transition from OTC to prescription strength at some point in therapy. Topical retinoids, especially in higher strengths, may be drying and irritating. It is recommended that patients using topical retinoids use sunscreen and moisturizers, as discussed earlier.

Salicylic acid is another OTC product for mild acne and is the active ingredient most commonly found in familiar brands (Olay®, CeraVe®, L'Oreal®, Neutrogena®, etc.). It works by increasing the turnover of epithelial cells, and is an option for patients with mild acne who have sensitive skin or cannot tolerate BP. Salicylic acid has a cumulative drying effect, and patients should be cautious about overuse if it's unknowingly in multiple of their facial products.

Prescription

Topical prescription strength retinoids are commonly used for acne, but can sometimes be limited by their drying and irritating nature. Topical antibiotics are available by prescription only too, but are not used as monotherapy to mitigate the potential of bacterial resistance. They work best when combined with BP or a topical retinoid, and there are various combination products to choose from. Azelaic acid and Dapsone (Aczone) are other topical agents available by prescription only, but they are generally reserved for patients who have not responded to other first-line options.

Oral antibiotics are useful for moderate-to-severe acne that has not responded to other therapies. Antibiotics used for acne (e.g., Doxycycline, Minocycline, and Sarecycline)

provide coverage for *P. acnes*. They should be limited to the shortest duration possible and, similarly to topical antibiotics, should not be used as monotherapy.[1] Oral contraceptives are an option for female athletes who have failed other standard therapies or are already using oral contraceptives for their primary purpose.

Two agents that should be avoided, when possible, in athletes are isotretinoin (Accutane, Amnesteem, Claravis) and spironolactone. Isotretinoin is an oral retinoid for severe refractory cases of acne. It is teratogenic and has been shown to cause increased skin fragility and erosions that may persist after treatment completion.[16] For example, a case report documented a high school wrestler who presented with skin erosions one month after completing a course of isotretinoin. Spironolactone should be avoided because it is included on the World Anti-Doping Agency's (WADA) List of Prohibited Substances. While athletes may file an exemption, it is preferable that the patient use a non-banned medication for the management of their acne.

Vitamins

Another consideration that is often overlooked when it comes to the management of acne is vitamin supplementation. While topical retinoids address the involvement of Vitamin A in the normalization of keratinization and down-regulation of sebum production, other vitamins (primarily C, D, and E) can also play a role in acne pathogenesis. Vitamin D deficiencies occur more frequently in patients with acne, and Vitamin D supplementation is a cost-effective and safe adjunctive therapy option.[17] Topical agents containing Vitamins A, C, E, and B3 have also been shown to be effective in treating photoaging and acne.[18]

Conclusion

Most patients can successfully manage their acne with lifestyle modifications and over-the-counter therapy options. Acne in athletes can be managed similarly to non-athlete patients but should be given special consideration to certain patient-specific factors that may contribute to acne, such as their type of sport, use of supplements, and skin care.

References:

1. Zaenglein, A. L., Pathy, A. L., Schlosser, B. J., Alikhan, A., Baldwin, H. E., Berson, D. S., Bowe, W. P., Graber, E. M., Harper, J. C., Kang, S., Keri, J. E., Leyden, J. J., Reynolds, R. V., Silverberg, N. B., Stein Gold, L. F., Tollefson, M. M., Weiss, J. S., Dolan, N. C., Sagan, A. A., … Bhushan, R. (2016). Guidelines of care for the management of Acne Vulgaris. Journal of the American Academy of Dermatology, 74(5). doi.org/10.1016/j.jaad.2015.12.037
2. Pujalte GGA, Costa LMC, Clapp AD, Presutti RJ, Sluzevich JC. More Than Skin Deep: Dermatologic Conditions in Athletes. Sports Health. 2023 Jan-Feb;15(1):74-85. doi: 10.1177/19417381211065026. Epub 2022 Jan 17. PMID: 35034516; PMCID: PMC9808835.
3. Skroza N, Tolino E, Mambrin A, Zuber S, Balduzzi V, Marchesiello A, Bernardini N, Proietti I, Potenza C. Adult Acne Versus Adolescent Acne: A Retrospective Study of 1,167 Patients. J Clin Aesthet Dermatol. 2018 Jan;11(1):21-25. Epub 2018 Jan 1. PMID: 29410726; PMCID: PMC5788264.
4. Hirschberg AL. Female hyperandrogenism and elite sport. Endocr Connect. 2020 Apr;9(4):R81-R92. doi: 10.1530/EC-19-0537. PMID: 32197237; PMCID: PMC7159262.
5. Silverberg NB. Whey protein precipitating moderate to severe acne flares in 5 teenaged athletes. Cutis. 2012 Aug;90(2):70-2. PMID: 22988649.
6. Simonart T. Acne and whey protein supplementation among bodybuilders. Dermatology. 2012;225(3):256-8. doi: 10.1159/000345102. Epub 2012 Dec 13. PMID: 23257731.
7. Meixiong J, Ricco C, Vasavda C, Ho BK. Diet and acne: A systematic review. JAAD Int. 2022 Mar 29;7:95-112. doi: 10.1016/j.jdin.2022.02.012. PMID: 35373155; PMCID: PMC8971946.
8. Smith RN, Mann NJ, Braue A, Mäkeläinen H, Varigos GA. A low-glycemic-load diet improves symptoms in acne vulgaris patients: a randomized controlled trial. Am J Clin Nutr. 2007 Jul;86(1):107-15. doi: 10.1093/ajcn/86.1.107. PMID: 17616769.
9. Reynolds RC, Lee S, Choi JY, Atkinson FS, Stockmann KS, Petocz P, Brand-Miller JC. Effect of the glycemic index of carbohydrates on Acne vulgaris. Nutrients. 2010 Oct;2(10):1060-72. doi: 10.3390/nu2101060. Epub 2010 Oct 18. PMID: 22253996; PMCID: PMC3257617.
10. Kwon HH, Yoon JY, Hong JS, Jung JY, Park MS, Suh DH. Clinical and histological effect of a low glycaemic load diet in treatment of acne vulgaris in Korean patients: a randomized, controlled trial. Acta Derm Venereol. 2012 May;92(3):241-6. doi: 10.2340/00015555-1346. PMID: 22678562.
11. Barclay AW, Augustin LSA, Brighenti F, Delport E, Henry CJ, Sievenpiper JL, Usic K, Yuexin Y, Zurbau A, Wolever TMS, Astrup A, Bulló M, Buyken A, Ceriello A, Ellis PR, Vanginkel MA, Kendall CWC, La Vecchia C, Livesey G, Poli A, Riccardi G, Salas-Salvadó J, Trichopoulou A, Bhaskaran K, Jenkins DJA, Willett WC, Brand-Miller JC. Dietary Glycaemic Index Labelling: A Global Perspective. Nutrients. 2021 Sep 17;13(9):3244. doi: 10.3390/nu13093244. PMID: 34579120; PMCID: PMC8466312.
12. Choi JM, Lew VK, Kimball AB. A single-blinded, randomized, controlled clinical trial evaluating the effect of face washing on acne vulgaris. Pediatr Dermatol. 2006 Sep-Oct;23(5):421-7. doi: 10.1111/j.1525-1470.2006.00276.x. PMID: 17014635.
13. Kang SY, Um JY, Chung BY, Lee SY, Park JS, Kim JC, Park CW, Kim HO. Moisturizer in Patients with Inflammatory Skin Diseases. Medicina (Kaunas). 2022 Jul 1;58(7):888. doi: 10.3390/medicina58070888. PMID: 35888607; PMCID: PMC9315586.
14. De Castro-Maqueda G, Gutierrez-Manzanedo JV, Lagares-Franco C, de Troya-Martin M. Sun Exposure during Water Sports: Do Elite Athletes Adequately Protect Their Skin against Skin Cancer? Int J Environ Res Public Health. 2021 Jan 19;18(2):800. doi: 10.3390/ijerph18020800. PMID: 33477791; PMCID: PMC7832317.
15. How to Apply Sunscreen. American Academy of Dermatology. (2023 Aug 30)
16. Pavlis, M. B., & Lieblich, L. (2013). Isotretinoin-Induced Skin Fragility in a Teenaged Athlete: A Case Report. Cutis, 92, 33–34.
17. Ahmed Mohamed A, Salah Ahmed EM, Abdel-Aziz RTA, Eldeeb Abdallah HH, El-Hanafi H, Hussein G, Abbassi MM, El Borolossy R. The impact of active vitamin D administration on the clinical outcomes of acne vulgaris. J Dermatolog Treat. 2021 Nov;32(7):756-761. doi: 10.1080/09546634.2019.1708852. Epub 2020 Jan 3. Erratum in: J Dermatolog Treat. 2020 Jan 21;:1. PMID: 31868550.
18. Burgess C. Topical vitamins. J Drugs Dermatol. 2008 Jul;7(7 Suppl):s2-6. PMID: 18681152.

Beauty from the Inside-Out:

Top 5 Supplements to Up Your Skin Game

By Sean Casey, RD, CSCS

AUTHORS BIO:

Sean Casey RD CSCS is a registered dietitian, movement coach and member of the Evolve Wellness Science Team at Hometown Pharmacy of Wisconsin. He specializes in sports nutrition, nutraceuticals, and proactive care.

Quick Hit Summary

When you look good, you feel good; when you feel good, you move with confidence. When it comes to looking good, skin quality plays a big role. Nutraceuticals that have been shown to support skin quality (hydration, elasticity, wrinkle reduction, acne) include MSM (1-3g/d), Collagen (2.5-10g/d), various antioxidants and phytonutrients such as Lutein (10mg/d) + Zeaxanthin (0.6-2g/d), essential vitamins and minerals along with microbiome supporting nutraceuticals. Additionally focus should be placed on nutrient dense whole foods while taking into consideration that for some people, foods like dairy, gluten containing may be triggering adverse skin reactions.

Looking Good & Feeling Confident

When you look good, you feel good; when you feel good, you move with confidence; when you're moving with confidence, the likelihood of hanging a 'W' dramatically increases.

This holds true whether we're talking about the business world, athletic arena, everyday life or in the case of many individuals, all the above!

With respect to looking good, one of the biggest determinants of how you feel about your outward appearance is based on your skin quality! If you're going for the job interview of your life, and feeling self-conscious about your skin, the interview becomes significantly more challenging. If you're competing in a sport where there is a lot of skin exposure coupled with getting judged on beauty/grace (figure model competitions, bodybuilding, etc), healthy skin is critical.

Even if your competitive sport of choice is not judged on visual appearance per say (football, volleyball, basketball, swimming, athletics), if you're suffering from intense acne on the face, psoriasis/rashes on exposed body parts, dry and wrinkly skin, etc., daily stress levels will naturally be higher, affecting your ability to recover and thus, negatively affecting athletic performance.

In other words, skin is pretty dang important when it comes to confidence and stress management. Now you're probably thinking, "Great observation Captain Obvious" and if you're like most people, you're looking at actionable steps to clean-up your current skin issues or prevent skin issues in the first place – And rightfully so!

Thus, without further ado, I'd like to share the Top 5 Supplements/Categories of nutritional supplements to up your skin game, starting with #5 before working our way down to the #1 – the grand champion for healthy looking skin!

Top 5 Nutraceuticals for Athletes & Skin Health

#5. Methylsulfonylmethane (MSM)

Although best known for its impact on supporting joint health and arthritis symptoms, MSM has been shown in multiple pilot studies to improve skin quality too.[1-3]

In one particularly interesting study, as little as 1-3 grams (g) per day (d) over a period of 16 weeks led to a significant improvement in facial wrinkles, skin firmness, elasticity and hydration levels.[1]

Along with its positive impact on skin and arthritis/joint issues one pilot study indicated that doses of 3g/d may also help reduce allergy symptoms.[4]

#4. Hydrolyzed Collagen

When it comes to beauty, is there any supplement basking in

the sunlight more so than collagen these days?!

It seems that every skin ad I see discusses "hydrolyzed collagen bioactive peptides" and for good reason – it seems to work based on science![5]

Although hydrolyzed collagen (HC) doesn't do much for skeletal muscle, based on current research it appears to be worth the 'squeeze' as it relates to supporting connective tissue (skin, tendons, ligaments, etc).

In a recently published meta-analysis, which combined data from 26 randomized controlled trials involving 1721 patients, it was found that HC significantly improved elasticity and skin hydration. In the case of the latter component, hydration effects were more pronounced when using collagen for > 8 weeks vs. < 8 weeks. Doses ranged from 1.0-10 grams (g) in the meta-analysis.[5] The trademarked collagen peptide, Verisol®, in doses as low as 2.5g/d, has also been shown to positively impact skin wrinkles and dermal matrix synthesis over a period of 8 weeks.[6]

Similar to MSM, multiple research studies have shown collagen to benefit joint health as well making it another 2 for 1![7]

#3. Antioxidants

Antioxidants are the firefighters of your body; they help to manage inflammation. Excessive inflammation is the root cause of every chronic disease and contributes to poor skin quality.

Many antioxidants including flavonoids and carotenoids appear to support skin health.[8] For instance, the phytonutrient combo of lutein (10mg/d) and zeaxanthin (0.6-2g/d) has been shown to support skin tone, elasticity and photoprotective activity in various studies.[9,10]

Additionally, as discussed in issue #6 of Sports Pharmacy Magazine (June 2023) antioxidants can act as prebiotics within the gut, influencing inflammation and overall microbiome health… Which as you will soon see, is quite important!

#2. Essential Nutrients: Vitamins, Minerals & Fatty Acids

Although vitamins, minerals and essential fatty acids (Omega 3, Omega 6) are not the sexiest of supplements vs. [insert your favorite trendy 'miracle elixir' excessively overhyped marketing media supplement of the month], truth be told, they're extremely important for skin health.[11,12]

Essential micronutrients like vitamins A, C, D, E along with minerals such as copper, zinc and selenium generally get most of the hype as it relates to skin health, but in reality, all micronutrients contribute to either directly or indirectly to it. For instance, someone may not think of magnesium for skin health, but this mineral is essential for energy production at the cellular level as well as overall stress management – something I'm sure we can all agree is important for healthy skin!

It's hard to provide exact micronutrient intake recommendations, but a good starting place is ensuring that you're at least meeting the USDA's Recommended Daily Allowance (RDA) and adjusting accordingly based on lifestyle and medications.

Additionally, both Omega 3's and surprisingly to many, the often maligned 'evil' Omega-6 fatty acids play key roles in skin health.[12] Most people consume more than enough of Omega 6's; thus I often place focus on Omega 3's when working with clients.

As a general rule of thumb, as it relates to Omega 3 fatty acids, 1-2g of EPA+DHA per day is a good starting place. To really zero in Omega 3 levels, one can complete Omega 3 Index test and dose according to results.

Essential micronutrients like vitamins A, C, D, E along with minerals such as copper, zinc and selenium generally get most of the hype as it relates to skin health, but in reality, all micronutrients contribute to either directly or indirectly to it.

#1 (Drumroll please) … Microbiome Supporting Nutraceuticals

As I tell clients, if you have a rash/skin issue and putting a cream on it doesn't clean the issue up within 7-10 days (max) or if the issue repeatedly comes back again, again and again, assuming that there is no environmental trigger irritating the skin, what you're dealing with is not a skin issue but rather a gut issue!

One's overall skin health is nothing more than a reflection of what's happening within the gut. In fact, within the scientific world, it's referred to as 'gut-skin' access and more often than not, if you heal your gut, you'll heal your skin![13]

How can gut health & supplements that support it be ranked higher than essential nutrients (vitamins, minerals, fatty acids) you ask?

Answer – if one's gut is not healthy enough to absorb the nutrients he or she is eating, simply throwing more vitamins, minerals, etc at it is like throwing a football or kicking a soccer ball straight into a stone barrier and expecting the person on the opposite end to be able to receive it!

Beyond the absorption of nutrients, your microbiome influences your immune system which impacts overall skin health via inflammatory processes.[13] An example of this is acne which affects many fitness and athletic orientated individuals.

In a fascinating pilot study completed by Rybak et al, researchers had 25 individuals suffering from acne consume a placebo for 4 weeks followed by 4 weeks supplementing with a probiotic blend.[14] For reference, the blend consisted of 4 billion CFU using the following strains: Bacillus indicus (HU36), Bacillus subtilis (HU58), Bacillus coagulans, Bacillus licheniformis, and Bacillus clausii. No changes in acne lesions were observed during the placebo time period. However, while consuming the probiotics, researchers found a significant decrease in total acne lesions, non-inflammatory lesions and a trend towards a reduction in inflammatory lesions (p =0.54).

Food Matters Too !!!

Although this article has focused mostly on supplements, I'd be remiss if I didn't point out the fact that one of the influencers of skin health is WHAT YOU EAT AND DRINK. More often than not, this impacts one's skin far greater than what supplements one is/is not taking.

Food can affect skin quality in two ways:

1. Certain foods may trigger adverse skin reactions via inflammation at the gut level (dairy, gluten, etc).
2. Many foods are high in anti-inflammatory antioxidants as well as key vitamins and minerals that directly/indirectly impact skin health (whole fruits, veggies, etc).

In other words, sports medicine professionals should focus on removing the 'offenders' while reinforcing the 'protectors.'

In Closing

When it comes to skin health, many variables come into play. Although one may be quick to turn to creams and lotion in an 'outside-in" approach to skin quality, it's important to not forget about the inside-out method. The use of MSM, collagen along with essential nutrients, antioxidants and other gut supporting approaches (food, probiotics, etc) can go a long way towards creating healthy, vibrant skin that promotes overall confidence while reducing daily stress in the life of an athlete or fitness enthusiast!

References:

1. Muizzuddin N, Benjamin R. Beauty from within: Oral administration of a sulfur-containing supplement methylsulfonylmethane improves signs of skin ageing. Int J Vitam Nutr Res. 2022 Jul;92(3-4):182-191.
2. Anthonavage M, Benjamin R, Withee E. Effects of Oral Supplementation With Methylsulfonylmethane on Skin Health and Wrinkle Reduction A randomized, placebo-controlled, double-blind clinical pilot study on OptiMSM. Natural Medicine Journal. 2015;7(11):1–16.
3. Butawan M, Benjamin RL, Bloomer RJ. Methylsulfonylmethane: Applications and Safety of a Novel Dietary Supplement. Nutrients. 2017 Mar 16;9(3):290.
4. Hewlings S, Kalman DS. Evaluating the Impacts of Methylsulfonylmethane on Allergic Rhinitis After a Standard Allergen Challenge: Randomized Double-Blind Exploratory Study. JMIR Res Protoc. 2018 Nov 29;7(11):e11139.
5. Pu SY, Huang YL, Pu CM, Kang YN, Hoang KD, Chen KH, Chen C. Effects of Oral Collagen for Skin Anti-Aging: A Systematic Review and Meta-Analysis. Nutrients. 2023 Apr 26;15(9):2080
6. Proksch E, Schunck M, Zague V, Segger D, Degwert J, Oesser S. Oral intake of specific bioactive collagen peptides reduces skin wrinkles and increases dermal matrix synthesis. Skin Pharmacol Physiol. 2014;27(3):113-9.
7. Martínez-Puig D, Costa-Larrión E, Rubio-Rodríguez N, Gálvez-Martín P. Collagen Supplementation for Joint Health: The Link between Composition and Scientific Knowledge. Nutrients. 2023 Mar 8;15(6):1332.
8. Anbualakan K, Tajul Urus NQ, Makpol S, Jamil A, Mohd Ramli ES, Md Pauzi SH, Muhammad N. A Scoping Review on the Effects of Carotenoids and Flavonoids on Skin Damage Due to Ultraviolet Radiation. Nutrients. 2022 Dec 24;15(1):92.
9. Palombo P, Fabrizi G, Ruocco V, Ruocco E, Fluhr J, Roberts R, Morganti P. Beneficial long-term effects of combined oral/topical antioxidant treatment with the carotenoids lutein and zeaxanthin on human skin: a double-blind, placebo-controlled study. Skin Pharmacol Physiol. 2007;20(4):199-210.
10. Juturu V, Bowman JP, Deshpande J. Overall skin tone and skin-lightening-improving effects with oral supplementation of lutein and zeaxanthin isomers: a double-blind, placebo-controlled clinical trial. Clin Cosmet Investig Dermatol. 2016 Oct 7;9:325-332.
11. Park K. Role of micronutrients in skin health and function. Biomol Ther (Seoul). 2015 May;23(3):207-17.
12. Essential Fatty Acids And Skin Health. Linus Pauling Institute. Accessed on Sept 19 from: https://lpi.oregonstate.edu/mic/health-disease/skin-health/essential-fatty-acids
13. Mahmud MR, Akter S, Tamanna SK, Mazumder L, Esti IZ, Banerjee S, Akter S, Hasan MR, Acharjee M, Hossain MS, Pirttilä AM. Impact of gut microbiome on skin health: gut-skin axis observed through the lenses of therapeutics and skin diseases. Gut Microbes. 2022 Jan-Dec;14(1):2096995.
14. Rybak I, Haas KN, Dhaliwal SK, Burney WA, Pourang A, Sandhu SS, Maloh J, Newman JW, Crawford R, Sivamani RK. Prospective Placebo-Controlled Assessment of Spore-Based Probiotic Supplementation on Sebum Production, Skin Barrier Function, and Acne. J Clin Med. 2023 Jan 23;12(3):895.

When the Skin Bites Back:

Handling Common Skin Infections in Athletes

By Dr. Jessica Beal-Stahl, Pharm.D.

AUTHOR BIO:

Jessica Beal-Stahl, PharmD, is the founder of The Athlete's Pharmacist company, tying her passions of athletics and pharmacy together where she works privately with clients to improve their performance in sport and life. She received her Doctorate of Pharmacy from Mercer University in 2009 and has been practicing as a Director of Clinical Services at Hobbs Pharmacy in Merritt Island, Florida, since graduation. Jessica also knows what it's like to be a high-level athlete, having played D1 volleyball, medaled internationally in Olympic weightlifting, and set at 41 years old a world record in Olympic Weighting for snatch in her age/weight class. She holds additional certifications in Integrative Medicine, Nutrigenomics, and Sports Nutrition.

For many athletes, participation in sports is about acquiring new skills, teamwork, sportsmanship, and much more. However, there are some things we don't want to acquire – such as skin infections. Athletes in any sport can face skin infections like impetigo and Methicillin-resistant Staphylococcus aureus (MRSA), preventing athletes from competing on the field, court, or mat of play. In many cases, good hygiene practices (e.g., regular showering) and early, appropriate at-home intervention can help minimize interruptions in the athlete's sports season.

Our skin is home to millions of bacteria, fungi, and viruses that compose the skin microbiota. Skin microorganisms protect against invading pathogens, educate our immune system, and break down natural products.[1] As the human body's largest organ, the skin is colonized and serves as a physical barrier to prevent the invasion of pathogens. When the barrier is broken, or the balance between commensals and pathogens is disturbed, skin disease or systemic disease can occur.

Two of the most common bacteria colonizing our body and leading to skin infections are Group A *Streptococcus* (GAS), often called "strep," and *Staphylococcus aureus*, commonly called "staph." Skin infections are not to be taken lightly; they are associated with 15% of time-loss injuries among athletes at the college level.[4]

Group A *Streptococcus* (GAS) bacteria is commonly found on the skin or throat and is often the cause of "strep throat." Some individuals carrying GAS may develop relatively mild skin infections, like impetigo.

Staphylococcus aureus bacteria is one of the most common causes of skin infections in the U.S. It is carried on the skin or in the nose of approximately 25% to 30% of healthy people without causing infection[2]-- this is called colonization.

Predisposing factors for infection include minor trauma, pre-existing skin disease, poor hygiene, and a depressed host immune system, which can be due to overtraining, traveling, and the stress of life. Athletes involved in contact sports are at higher risk for developing skin infections. For example, athletes participating in wrestling, boxing, swimming, gymnastics, or football risk due to direct skin contact with other players, gym mats, and the showers in the locker rooms.[3]

While mild cases of common skin infections may be treated without seeing a healthcare provider, athletes should have a medical professional determine the type of infection, how to treat it, and if it is contagious. If the infection is contagious, athletes should not practice or compete until their medical provider clears them to return to prevent the spreading of the infection.

Impetigo: A concern for athletes

Impetigo is a highly contagious bacterial infection of the skin caused by Group A Streptococcus. The term impetigo comes from the Latin verb "impetere," meaning to attack.

The condition occurs most frequently in preschool and school-age children and athletes who play sports involving a high degree of physical contact or indirectly by contacting an item already contaminated by the bacteria, such as a wrestling mat, gear, towel, razor, or cell phone.

Impetigo has two forms: nonbullous and bullous. The nonbullous form is more common, accounting for 70% of all cases, and appears on the skin as a pustule or golden crusty sore surrounded by red infection.[5] By contrast, the bullous form of impetigo manifests as a macule or red rash that resembles a burn mark.

Common symptoms:

- Symptoms begin 1-3 days after infection.
- Sores begin as small red spots, usually on the face (often nose and mouth), and easily spread to the extremities and torso.
- The sores are often itchy but usually not painful.
- The sores develop into blisters that break open and ooze fluid -- this fluid contains infectious bacteria that can infect others if they have contact with it.
- After a few days, ruptured blisters form a flat, thick, honey-colored (yellowish-brown) crust that eventually disappears, leaving red marks that heal without scarring.
- There may be swollen glands (enlarged lymph nodes), but usually no fever.

The skin patches associated with impetigo can resemble those seen in other skin diseases, such as eczema, psoriasis, poison ivy, lupus, or shingles. It's essential to have the rash checked out. While impetigo may clear up on its own within 2 to 3 weeks, primary treatment consists of topical antibiotic ointments; more severe cases will also require oral antibiotics.

If you even suspect impetigo, avoid contact with others until you know you are not infected or have been on medication for at least 72 hours, no moist/crusty wounds, and no new lesions for at least 48 hours. Taking measures to prevent contracting or spreading impetigo will benefit everyone.

MRSA: The not-so-famous superbug

In this day and age, you would have to be living under a rock to have avoided the terms "staph infection" or "MRSA."

These skin infections caused by *Staphylococcus aureus*, or "staph," are minor, such as pimples and boils, not spread to others, and usually can be treated without antibiotics. Staph infections are now commonplace among competitive and recreational athletes.

Mild cases of staph include folliculitis, a superficial infection of the hair follicles characterized by redness, fluid, or pus-filled sacs at the base of hair follicles. These pustules can develop on the scalp, flexural areas, underarms, and lower legs or thighs and spread easily by shaving. Furuncles are deeper hair follicle infections characterized by inflamed nodules that drain fluid, which can join to form larger nodules called carbuncles. These solitary abscesses are often seen on the buttocks and thighs but can also appear elsewhere.[6]

Some staph bacteria are resistant to certain antibiotics -- one is methicillin-resistant *Staphylococcus aureus* or MRSA. Until the early 1990s, MRSA was confined to hospitals, with the first reports of community-acquired MRSA (CA-MRSA) surfacing in the late 1980s. Its community prevalence has continued to grow, and recent statistics suggest MRSA now causes 50% of skin infections and is the most frequent cause of skin infections presenting in the emergency room.[7]

MRSA infections commonly occur with a break in the skin (for example, a cut or wound), especially in areas covered by hair (i.e., beard area, back of the neck, armpit, groin, legs, or buttocks). Initially, it presents as a solitary abscess or bumps on the skin that may be red, swollen, warm to the touch, or even pus-filled. The pus or drainage contains infectious bacteria which can spread to others. MRSA infections are commonly confused with a spider bite. MRSA may also take the form of any other type of staph infection, including impetigo and folliculitis.

Additionally, some infections can lead to abscess formation and cellulitis. Though rare, it can persist in invasive diseases such as bacteremia, septic arthritis, osteomyelitis, fasciitis, and pneumonia in up to 10% of cases.[8]

MRSA is particularly challenging to treat; it's resistant to standard penicillin-based antibiotic therapies due to genetic mutations. Although effective antibiotic treatments are available, MRSA infections are often misdiagnosed initially as typical staph infections.

Like impetigo, athletes involved in high physical-contact sports are at risk of getting and spreading the infection. The most common transmission route is through an open wound, such as a superficial abrasion after contact with a MRSA carrier. Wrestling mats, artificial turfs, locker rooms, and football training equipment have documented MRSA colonization.[9]

The risk of transmission in athletes increases with poor hand washing, not showering after a workout, sharing personal items, such as razors, towels, and clothing, or not properly cleaning and disinfecting exercise or training equipment.

Screening of players and topical mupirocin for those found to have colonization, using chlorhexidine washes, and enhancing personal hygiene practices are crucial for managing MRSA outbreaks.[9]

MRSA can be notoriously difficult to clear and often requires prolonged and repeated antibiotic therapy with Bactrim, doxycycline, or clindamycin. The primary treatment for MRSA skin and soft tissue infection includes incision and drainage if an abscess is present, followed by antibiotic treatment.

Affected athletes must complete at least 72-hour antibiotic therapy, cover affected areas with protective clothing, and examine the wound daily for signs of recurrence or worsening of the infection. Due to the contagious nature of bacterial infections, athletes should not be allowed to cover an active sore to play. They should meet the above criteria before returning to sport.[10]

Prevention is Key

Outbreak prevention is accomplished through meticulous focus on good hygiene practices, prompt identification of infected people, limiting exposure to infected people and contaminated surfaces and objects, decontaminating the environment, and proper treatment and close follow-up of infected people.[11]

- **Wash your hands.** Use soap and water or an alcohol-based sanitizer. Clean your hands before and after playing sports, using shared weight training equipment, and changing a bandage on a wound.
- **Take showers.** Shower immediately after exercise. Don't share items that touch your bare skin — bar soap, razors, or towels.
- **Use barriers.** Cover cuts and scrapes with a bandage to keep germs out. Lay a towel down as a barrier between your skin and benches in weight rooms, locker rooms, and saunas.
- **Wash your clothing and equipment**. Wash your workout clothing and uniform after each use and dry clothes entirely in the dryer.

In addition, athletic programs should ensure regular (daily, weekly, and monthly) cleaning of facilities and equipment (e.g., weight room, railings, mats, blocking dummies, locker rooms, and showers).[12] Those who manage sports programs and facilities should develop a plan for properly cleaning and maintaining a sanitary sporting environment using guidelines such as those published by the American College of Sports Medicine.

References:

1. Belkaid, Y. & Segre, J. A. Dialogue between skin microbiota and immunity. *Science* 346, 954–959 (2014).
2. Staphylococcus aureus Infections - Infections - MSD Manual Consumer Version (msdmanuals.com)
3. Redziniak DE, Diduch DR, Turman K, Hart J, Grindstaff TL, MacKnight JM, Mistry DJ. Methicillin-resistant Staphylococcus aureus (MRSA) in the Athlete. Int J Sports Med. 2009 Aug;30(8):557-62. doi: 10.1055/s-0029-1214382. Epub 2009 May 25. PMID: 19468969.
4. Begier EM, et. al. Connecticut Bioterrorism Field Epidemiology Response Team. A high-morbidity outbreak of methicillin-resistant Staphylococcus aureus among players on a college football team, facilitated by cosmetic body shaving and turf burns. Clin Infect Dis. 2004 Nov 15;39(10):1446-53. doi: 10.1086/425313. Epub 2004 Oct 26. PMID: 15546080.
5. Cole C, Gazewood J. Diagnosis and treatment of impetigo. *Am Fam Physician*. 2007 Mar 15. 75(6):859-64.
6. Stevens DL. 10.1007/978-1-4614-0688-4_9 Cellulitis, pyoderma, abscess, and other skin and subcutaneous infections. In: Cohen and Powderly, editors. Infectious diseases, 2nd ed. Elsevier 2004.
7. Moran GJ, Krishnadasan A, Gorwitz RJ, Fosheim GE, McDougal LK, Carey RB, Methicillin-resistant *Staphylococcus aureus* infections among patients in the emergency department. N Engl J Med. 2006;355:666–74.
8. Gouveia C, Gavino A, Bouchami O, et al. Community-associated methicillin-resistant Staphylococcus aureus lacking PVL, as a cause of severe invasive infection treated with linezolid. *Case Rep Pediatr*. 2013;v2013v:v7278
9. Oller AR, Province L, Curless B. Staphylococcus aureus recovery from environmental and human locations in 2 collegiate athletic teams. J Athl Train. 2010 May-Jun;45(3):222-9. doi: 10.4085/1062-6050-45.3.222. PMID: 20446834; PMCID: PMC2865959.
10. Zinder SM, et al. National Athletic Trainers' Association position statement: Skin diseases. Journal of Athletic Training. 2010;45:411.
11. Braun T, et al. Community-associated methicillin-resistant staphylococcus aureus infection rates and management among student-athletes. Medicine & Science in Sports & Exercise. 2018;50:1802.
12. Hostetter KS, Lux M, Shelley K, Drummond JL, Laguna P. MRSA as a health concern in athletic facilities. J Environ Health. 2011 Jul-Aug;74(1):18-25; quiz 42. PMID: 21830686.

THANK YOU TO OUR PARTNERS!

Klean Athlete
https://www.kleanathlete.com/

Functional Medicine Group
https://functionalmedicinegroup.com/membership/

Metagenics
https://www.metagenics.com/

Nutrigenomix
https://nutrigenomix.com/

REVBALANCE
https://revbalance.com/

SportPharm
https://SportPharm.pro/

NASM
https://nasm.org/

Publisher Disclaimers

The opinions expressed in our published works are those of the author(s) and do not reflect the opinions of Sports Pharmacy Magazine or Pharmacy Athlete or its Editors.

Information contained in our published works have been obtained by Sports Pharmacy Magazine from sources believed to be reliable. However, neither Sports Pharmacy Magazine nor its authors guarantees the accuracy or completeness of any information published herein and neither Sports Pharmacy Magazine nor its authors shall be responsible for any errors, omissions, or claims for damages, including exemplary damages, arising out of use, inability to use, or with regard to the accuracy or sufficiency of the information contained in Sports Pharmacy Magazine.

Neither the editor, authors, publisher, or any other party associated with the production of Sports Pharmacy Magazine manuals/works accept responsibility for any accident or injury resulting from the use of materials contained herein. Sports is an activity that has inherent risks. An individual may experience injury that can result in disability or death. All persons who wish to engage in sports activities must receive professional instructions. Sports Pharmacy Magazine manuals/works do not constitute legal, medical, or other professional advice. Information in Sports Pharmacy Magazine is current as of the date of the printing.

Medical Related Publications:
The opinions expressed in our published works are those of the author(s) and do not reflect the opinions of Sports Pharmacy Magazine or its Editors.

Information contained in our published works have been obtained by Sports Pharmacy Magazine from sources believed to be reliable. However, neither Sports Pharmacy Magazine nor its authors guarantees the accuracy or completeness of any information published herein and neither Sports Pharmacy Magazine nor its authors shall be responsible for any errors, omissions, or claims for damages, including exemplary damages, arising out of use, inability to use, or with regard to the accuracy or sufficiency of the information contained in Sports Pharmacy Magazine.

No responsibility is assumed by the Publisher or Editors for any injury and/or damage to persons or property as a matter of product liability, negligence, or otherwise, or from any use or operation of any methods, product, instructions, or ideas contained in the published material. No suggested test or procedure should be carried out unless, in the reader's judgment, its risk is justified. Because of rapid advances in the medical sciences, we recommend that the independent verification of diagnoses and drug dosages should be made. Information in this publication is current as of the date of the printing.

SPORTSRXNEWS
DECODING THE SCIENCE OF ELITE HUMAN PERFORMANCE
www.sportsrxnews.com