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EPISTAXIS AND ALLERGIC RHINITIS IN ATHLETES: PREVALENCE ACROSS SPORTS AND CONTEMPORARY MANAGEMENT STRATEGIES BASED ON LATEST EVIDENCE – A NARRATIVE REVIEW

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ABSTRACT

Purpose: This study aims to evaluate the prevalence of epistaxis and allergic rhinitis among athletes across different sports disciplines, and to review current management strategies based on recent clinical evidence.
Materials and Methods: A comprehensive literature review was conducted, analyzing epidemiological data on epistaxis and allergic rhinitis incidence in various sports including contact, endurance, and outdoor disciplines. Management protocols were assessed with a focus on conservative, pharmacologic, and interventional treatments reported in randomized controlled trials and clinical guidelines.
Results: Epistaxis was found to be more prevalent in contact sports such as boxing and rugby, predominantly due to trauma, whereas endurance and outdoor sports athletes experienced nosebleeds related to environmental dryness and mucosal irritation. Allergic rhinitis prevalence correlated strongly with exposure to allergens, particularly in outdoor sports during pollen seasons. Conservative management, including nasal compression and topical treatments, was effective in most anterior epistaxis cases. Cauterization and nasal packing remained standard for refractory bleeds, with newer hemostatic agents and tranexamic acid showing promising results. Allergic rhinitis was best managed through allergen avoidance, nasal saline irrigation, and intranasal corticosteroids, with combination antihistamine-corticosteroid sprays providing superior symptom control.
Conclusions: Epistaxis and allergic rhinitis represent significant yet manageable health concerns in athletes, with prevalence influenced by sport type and environmental factors. Tailored, sport-specific management strategies improve outcomes and reduce performance disruptions. Further research into preventative measures and individualized therapies is warranted to enhance athlete care.

KEYWORDS
Epistaxis, Allergic Rhinitis, Athletes, Nasal Bleeding Management, Nasal Packing, Tranexamic Acid

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Introduction.

Nasal conditions such as epistaxis and allergic rhinitis are frequently encountered in athletes and can significantly affect both performance and safety during training and competition. Epistaxis, or nosebleed, is the most common form of bleeding in contact sports, particularly in disciplines such as wrestling, boxing, karate, and taekwondo. It typically results from direct trauma to the nose and most often originates from the anterior part of the nasal septum, especially in the region of Kiesselbach's plexus. Although usually benign and self-limiting, recurrent or uncontrolled epistaxis may lead to match interruptions, medical disqualification, or underlying complications such as nasal fractures or septal hematomas, which require prompt diagnosis and management. Environmental factors like dry air and repeated mechanical irritation further increase the vulnerability of the nasal mucosa among athletes.

In addition to trauma-related causes, non-traumatic conditions such as allergic rhinitis represent another significant contributor to nasal symptoms in athletic populations. Allergic rhinitis is one of the most prevalent chronic respiratory diseases worldwide, particularly affecting young adults and elite athletes during their peak performance years. Its symptoms—ranging from nasal congestion and sneezing to rhinorrhea and ocular discomfort—can impair sleep quality, concentration, and cardiorespiratory efficiency, thereby compromising athletic output. Moreover, athletes frequently train or compete outdoors, exposing them to high levels of airborne allergens such as pollen or mold spores, which may exacerbate symptoms.

Despite the high prevalence and performance implications of these nasal disorders, they are often underrecognized or inadequately managed in sports medicine. The purpose of this review is to highlight the frequency of epistaxis and allergic rhinitis among athletes across various sport disciplines and to discuss evidence-based treatment strategies in light of the most current scientific literature. Through this dual focus—on epidemiology and up-to-date management—this work aims to provide clinicians, trainers, and athletes with practical, sport-specific insights into the recognition, treatment, and prevention of these conditions.

Methodology.

This narrative review was conducted to investigate the prevalence and clinical management of epistaxis and allergic rhinitis in athletes. The primary objective was to determine how frequently these conditions occur in selected sports disciplines, followed by an analysis of the latest evidence-based treatment strategies. The overarching goal was to highlight the clinical relevance of these nasal conditions in sports medicine and their potential impact on athletic performance and participation.

The literature search was carried out in May 2025 using PubMed and UpToDate as the main sources of scientific and clinical information. The search strategy involved keywords such as "epistaxis," "allergic rhinitis," "nasal trauma," "epistaxis management," "allergic rhinitis management," along with terms like "sport" and "athletes." For instance, the search phrase "(epistaxis OR rhinitis) AND (sport OR athletes)" was used to retrieve a broad range of relevant studies addressing both the epidemiology and treatment of nasal conditions in athletic populations.

Titles and abstracts were screened for relevance, with a focus on studies discussing the prevalence of epistaxis and allergic rhinitis among athletes, their clinical manifestations, and their management in the context of training and competition. Studies unrelated to sports or athletic populations, as well as those without

accessible full texts or abstracts, were excluded. Publications that overlapped in content were also removed to avoid redundancy.

After applying these inclusion and exclusion criteria and eliminating duplicates, a total of 67 studies were selected for detailed review. These included original research articles, clinical studies, systematic reviews, and case reports that met the predefined objectives. The final synthesis presents a focused evaluation of how often epistaxis and allergic rhinitis occur in athletes from various sports disciplines, and how these conditions should be diagnosed, treated, and prevented in light of the most recent scientific findings.

Results.

Epistaxis (nosebleed) is the most common type of bleeding seen in wrestling and other contact sports, typically resulting from direct trauma to the nose. It usually presents unilaterally and originates from the anterior part of the nasal septum, most often at Kiesselbach's plexus. Environmental factors such as dry winter air can further increase the fragility of the nasal mucosa, making athletes more susceptible to nosebleeds. During a match, prompt control of nasal bleeding is essential to prevent delays or possible disqualification. Athletes are advised to blow their nose to clear any clots before a cotton roll is inserted to apply pressure; part of the roll should remain visible for easy removal later [41]. If bleeding persists after the match, clearing the nasal cavity again is recommended. A nasal spray containing 0.05 % oxymetazoline can be administered directly or used to soak a cotton roll, which is then left in the nose for 4–5 minutes. Persistent bleeding may require gentle cautery with silver nitrate. To reduce recurrence, applying antibiotic ointment or petroleum jelly to the septum can be helpful [41].

Epistaxis is also commonly observed in striking martial arts such as karate and taekwondo, particularly among male athletes, with prevalence rates ranging from 3.2 % to 24.2 % depending on the study population [42–47]. In a study by Pieter and Zemper, nosebleeds were recorded in 1.2 % of cases [47], whereas Beis et al. found a rate of 13.5 % among young female athletes [46].

Nasal fractures are the most frequently reported facial injuries in sports, accounting for up to 50 % of all sports-related facial trauma. About 15 % of these are recurrent injuries [48]. Often underestimated, nasal fractures may go undertreated, potentially leading to complications such as nasal deformity or chronic breathing issues that impair athletic performance. Nosebleeds frequently accompany these fractures, and diagnosis is usually clinical. While imaging is rarely needed, CT scans are preferred over traditional x-rays when further evaluation is necessary, especially to detect subtle fractures or differentiate between recent and older injuries.

Typical signs of nasal fracture include visible deformity, epistaxis, tenderness, periorbital bruising, and crepitus. Prior to examination, ensuring airway patency is crucial. Adequate lighting and vasoconstrictors may be used to improve visualization during active bleeding. In rare cases, the presence of clear nasal fluid or a sweet taste in the mouth could indicate cerebrospinal fluid (CSF) leakage, a condition requiring urgent attention due to the risk of meningitis [49, 50].

Special attention should be paid to the nasal septum, especially in athletes who report nasal obstruction, as this could indicate a septal fracture or dislocation. A bluish, swollen area on the septum may represent a septal hematoma, which requires immediate drainage to prevent serious complications like infection, necrosis, or permanent deformity. A full injury history, including any prior nasal trauma or surgery, should be taken into account. When in doubt, comparing the current appearance with previous photographs or identification documents may be helpful [49].

If nasal deformity or persistent bleeding is observed shortly after injury, a closed reduction may be performed [51]. However, athletes should be informed that this procedure may not restore full nasal symmetry and that 14 % to 50 % of cases may eventually require corrective surgery [52]. If swelling obscures the assessment, it is often best to wait several days before initiating definitive treatment.

In competitive wrestling, nosebleeds frequently result from contact with opponents or the mat. Familiarity with the event's bleeding-time regulations is essential. Although many nosebleeds resolve spontaneously, those lasting more than 3–4 minutes usually respond well to direct pressure. The application of ice locally or on the back of the neck can stimulate reflex vasoconstriction to help control bleeding [53]. Cotton rolls (commonly called "nose rockets") may be inserted into the nostrils, and their effectiveness can be enhanced by soaking them in vasoconstrictors such as phenylephrine or oxymetazoline. Over-the-counter hemostatic agents may also be used. These aids can remain in place until the end of the match, but if bleeding persists, the athlete must be withdrawn from competition.

Persistent epistaxis may be a sign of an underlying nasal fracture. If no deformity is present, the primary goal is bleeding control [54]. If deformity is noted, early reduction may be indicated. Every suspected fracture should also be assessed for septal hematoma. In some cases, protective facemasks can allow continued participation. Severe or prolonged bleeding may suggest injury to the ethmoid artery and necessitate specialist care.

Although less common, epistaxis can also occur due to sinus barotrauma in sports such as diving. Frontal sinus barotrauma is the second most frequent diving-related injury after middle-ear trauma. A case study involving a 26-year-old diver with a left frontal hemosinus, confirmed by CT, underscores the potential for significant symptoms including severe frontal pain and epistaxis. Management focuses on symptomatic relief and addressing any anatomical contributors, with complications involving the orbit or brain being rare [55].

In combat sports like boxing, similar trends are observed. A retrospective analysis of female boxing competitions in Italy (2002 – 2007) showed normal post-bout medical findings in 98.2 % of 2 749 athletes. However, 1.8 % had clinical findings, including 12 cases of epistaxis and one nasal bone fracture [56].

A prospective cohort study across four karate championships documented 257 injuries, with an incidence rate of 41.4 per 1 000 athlete exposures (95 % CI: 36.4 – 46.3). Most injuries (69.6 %) were facial, and among these, nosebleeds were reported in 24.1 % of cases. Female athletes had a significantly lower injury rate, with a rate ratio of 0.63 (95 % CI: 0.48 – 0.82) [57].

In Muay Thai, a study involving 663 athletes (445 males, 218 females) found that 91.4 % completed their matches without health issues. However, 24.58 % of matches ended with a Referee Stopping Contest (RSC) decision. Medical attention was needed for 68 athletes (10.25 %), with epistaxis being the most common injury (1.96 %), followed by concussions, rib injuries, and extremity soft-tissue strains [58].

Allergic Rhinitis in Athletes

Non-traumatic causes of nasal symptoms in athletes include allergic rhinitis — one of the most prevalent chronic respiratory disorders, affecting 10 – 20 % of the general population [59, 60] and up to 40 % in certain areas, with even higher rates among elite competitors [61–63]. The condition typically manifests between ages 6 and 25, aligning with many athletes' peak performance years. Allergic rhinitis is defined as an IgE-mediated inflammation of the nasal mucosa after allergen exposure [59]. Hallmark symptoms include sneezing, nasal congestion, rhinorrhea and itching; associated complaints may involve headaches, reduced sense of smell and ocular irritation. Its impact on quality of life, productivity, and athletic performance can be substantial [64–67].

Management of Anterior Epistaxis (Nosebleeds)

Initial Conservative Treatment

Minor anterior nosebleeds often resolve spontaneously or with simple nasal compression. If the bleeding stops and no clear source is identified, packing is not necessary unless rapid recurrence occurs (1, 2). Observation for 30 minutes is reasonable. Patients may be discharged with instructions to apply antibiotic ointment to the nasal mucosa three times daily for three days. Rebleeding is relatively uncommon, especially among younger individuals (3).

Cauterization

If the bleeding source is visible, the first-line approach is either chemical or electrical cautery (4, 5). Chemical cautery is performed with silver nitrate sticks. The agent should be applied after local anaesthesia, starting from the periphery and moving inward. Bilateral septal cauterisation should be avoided due to the risk of septal necrosis (1, 5, 6, 7). Electrical cautery is similarly effective but can be painful without adequate anaesthesia and tends to be less successful on actively bleeding surfaces (6).

Nasal Packing

If cautery proves unsuccessful, anterior nasal packing is the next step (4, 5). Nasal tampons such as Merocel are easy to place and effective. They should be pretreated with a vasoconstrictor and anaesthetic, coated with bacitracin, then inserted and expanded with 10 mL of saline (10). Gauze or ribbon packing is equally effective but more technically demanding, involving petrolatum- or BIPP-impregnated ribbon gauze (8). A randomised controlled trial found no difference in efficacy when compared with Merocel (8). Balloon catheters, such as Rapid Rhino, offer simpler insertion and better patient tolerance. These should be soaked in sterile water before inflation and have shown similar efficacy to tampons, with higher patient satisfaction (9, 10).

Hemostatic Foams and Gels

Adjunctive agents like Quixil, Floseal, Surgicel, Gelfoam and Avitene are valuable when both cautery and packing fail. Clinical trials report that Floseal reduces rebleeding rates and improves provider and patient satisfaction compared with standard packing (18, 19, 20).

Tranexamic Acid (TXA)

In cases of refractory bleeding, saturating a Merocel tampon with 500 mg of intravenous tranexamic acid can be effective (11). A systematic review and meta-analysis has shown that TXA improves primary haemostasis and reduces rebleeding (12). However, the NoPAC randomised controlled trial found no benefit over saline (13).

Persistent Bleeding

When initial packing fails, packing the contralateral nostril may help by improving tamponade. ENT consultation is advised when bilateral packing becomes necessary. Anterior packing successfully controls haemorrhage in 90–95 % of cases (8, 17), and failure should raise suspicion for a posterior source.

Special Cases

Patients with hereditary haemorrhagic telangiectasia (HHT) often require tailored management strategies, and clinicians should refer to dedicated HHT guidelines in such cases.

Antibiotics and Toxic Shock Syndrome (TSS)

Toxic shock syndrome following nasal packing is rare—approximately 16 cases per 100,000 (10, 14, 15)—but clinicians should remain vigilant for signs such as fever, hypotension and rash. Routine systemic antibiotics do not reliably prevent TSS and carry risks like resistance and adverse effects. Despite this, many ENT specialists continue to prescribe prophylactic antibiotics (14, 15, 16). If antibiotics are used, reasonable choices include amoxicillin-clavulanate, a first-generation cephalosporin, or topical mupirocin (14).

Follow-Up

Patients with stable vital signs and no ongoing bleeding may be reviewed by ENT within 24 to 48 hours. Before removal, Merocel packing should be rehydrated to minimise discomfort. Patients with bilateral packing require earlier reassessment (8, 17). Otherwise healthy individuals whose bleeding resolves with conservative measures usually do not need referral; however, those with recurrent bleeding or an unclear aetiology should be further evaluated.

Prevention

To reduce the risk of recurrence, patients should be advised to use a bedroom humidifier, apply a thin layer of bacitracin or mupirocin to the septum, and direct nasal sprays away from the septum (1).

Management of Posterior Epistaxis

Posterior nosebleeds are less common but tend to be more severe; tamponade remains the mainstay of treatment. The preferred method is the use of dedicated posterior balloon catheters. Alternatives include Foley catheters or posterior cotton packing. Uncontrolled bleeding requires urgent ENT involvement.

Purpose-built devices, such as the Epistat catheter, have separate posterior and anterior balloons. The standard technique involves topical lidocaine and oxymetazoline application, inflation of the posterior balloon with 10 mL sterile water, gentle retraction to seat the balloon, followed by inflation of the anterior balloon (9). These devices should be removed within three days.

When bespoke posterior balloon catheters are unavailable, a Foley catheter sized 10–14 French may be used. After lubrication, it is advanced to the nasopharynx and inflated initially with 5–7 mL of water, then gently retracted to seat it, followed by additional inflation with 5 mL. The catheter is secured externally. Some clinicians use air to reduce aspiration risk, though this carries the possibility of early deflation (9).

Posterior cotton packing involves the traditional red rubber catheter ‘draw-through’ technique. One European trial showed efficacy comparable to balloon devices (17), but this method has a higher risk of hypoxia, so hospital admission is routine.

Hospitalisation and Complications

Patients suspected of posterior bleeding, those with unreliable follow-up, significant comorbidities, or requiring prolonged packing should be admitted. Complications in hospitalized patients occur in approximately 3% and include synechiae formation, aspiration, cardiovascular events, and hypovolaemia. The concept of a “nasopulmonary reflex” lacks supporting evidence (3, 4).

Escalation of Care

For refractory bleeding, endoscopic arterial ligation targeting the sphenopalatine or anterior ethmoid arteries is effective (2, 4). Angiographic embolisation achieves about 90% success but carries risks such as

stroke or visual loss in roughly 4% of cases (2). Small randomised trials and evolving techniques limit direct comparisons. When definitive interventions are unavailable, continued packing with hospital admission remains a reasonable approach.

Management of Allergic Rhinitis

Nonpharmacologic Strategies for All Patients

Allergen avoidance is recommended for all patients with suspected or confirmed sensitivities, such as pollen, dust mites, pets, or mold. This approach is particularly helpful for individuals concerned about medication side effects, including children and pregnant people.

Nasal saline, either as a spray or irrigation, is recommended across all severity levels. It may serve as monotherapy in mild cases or be used adjunctively in moderate to severe cases. The frequency of use varies from as needed to daily or twice daily. Saline works by physically removing allergens and soothing the nasal mucosa. Large-volume irrigation (>200 mL per side) is more effective than sprays but requires patient cooperation. Only distilled, sterilised, or previously boiled water should be used to prevent rare but potentially fatal infections, such as amebic meningoencephalitis (21, 22). Nasal saline therapy has demonstrated efficacy across various rhinitis types (23, 24, 25).

Pharmacologic Therapy (Ages ≥2 Years)

For mild or intermittent symptoms, the first-line treatment is glucocorticoid nasal sprays, which are superior to oral antihistamines (26, 27). Treatment should begin two days before anticipated allergen exposure and continue for two days after (26, 28). Meta-analyses suggest that as-needed steroid sprays are more effective than as-needed oral antihistamines but less effective than regular use (27).

Alternatives include antihistamine nasal sprays such as azelastine and olopatadine, which provide rapid relief especially in cases of unpredictable exposures. Combination sprays like azelastine-fluticasone (approved for age six and older) or olopatadine-mometasone (approved for age 12 and older) have an onset of action within 15 to 30 minutes and high efficacy (35, 36, 37). Minimally sedating oral antihistamines (e.g., cetirizine, fexofenadine, bilastine) can be taken 2–8 hours before exposure. Cromolyn spray is safe but less effective and requires pre-treatment ranging from 30 minutes up to 7 days.

For seasonal symptoms, glucocorticoid sprays alone or combined with antihistamine sprays are preferred (26, 27, 28). These should be started at least one week before the allergen season and doses adjusted once symptoms are controlled. Using local allergy forecasts can help with timing.

Moderate to severe or persistent symptoms warrant daily glucocorticoid sprays or combination sprays. Antihistamine sprays, oral antihistamines, or oral antihistamine/decongestant combinations may also be considered. Children aged five and above with persistent symptoms should be referred for immunotherapy evaluation.

Glucocorticoid Nasal Sprays

Patients should start with the maximum age-appropriate dose and taper once symptoms are controlled. Daily use may be necessary, though some patients do well on alternate-day dosing. Onset of action occurs within a few hours, but full effect may take days to weeks (29, 30, 31). Glucocorticoid sprays are the most effective monotherapy, outperforming oral antihistamines, especially for nasal congestion (26, 27, 32, 33, 34, 35).

Preferred agents include second-generation sprays with low systemic bioavailability, such as fluticasone furoate, fluticasone propionate, mometasone, and ciclesonide (36, 37, 38, 39, 40, 41). Dry aerosol sprays like Qnasl (beclomethasone HFA) and Zetonna (ciclesonide HFA) are available. Fluticasone should be avoided in patients taking strong CYP3A4 inhibitors (e.g., ritonavir, itraconazole, nefazodone). If a spray is ineffective, additional therapy should be added rather than switching sprays.

Combination Glucocorticoid/Antihistamine Sprays

For patients aged six and older, azelastine-fluticasone is available, and for those aged 12 and older, olopatadine-mometasone is an option. These combinations are superior to monotherapy (35, 36, 37). If these products are not commercially available, separate sprays can be combined.

Proper Nasal Spray Technique

For aqueous sprays, the head should be positioned slightly forward and spraying away from the septum. Aerosol sprays require tilting the head back, inhaling gently, and exhaling through the mouth. Patients should avoid blowing their nose for 15 minutes after use. Spray tips should be cleaned weekly.

Pretreatment

A saline rinse can help with crusting or congestion prior to starting glucocorticoids. Decongestant sprays should be used short-term (no longer than five days). If ineffective, a short course of oral glucocorticoids may be considered.

Discussion.

This review highlights the high prevalence and clinical significance of epistaxis and allergic rhinitis in athletic populations, particularly among those involved in contact sports or outdoor activities. Both conditions, although frequently perceived as benign or minor, can profoundly affect athletic performance, safety, and participation if not properly addressed.

Epistaxis is shown to be the most common type of bleeding in contact sports, especially wrestling, karate, boxing, and taekwondo. The nasal septum's anterior region, particularly Kiesselbach's plexus, is highly susceptible to trauma-induced bleeding. Although most nosebleeds are self-limiting, recurrent or uncontrolled episodes can disrupt competitions and may signal more serious injuries, such as nasal fractures or septal hematomas. These complications, if unrecognized or untreated, could lead to long-term deformities or functional impairments, ultimately diminishing athletic capability. Interestingly, the literature reveals a significant variance in epistaxis prevalence rates across sports and study populations, with male athletes more frequently affected than females. This could reflect anatomical, hormonal, or behavioral differences, but more comparative studies are needed to clarify these associations.

From a management perspective, the review underscores the importance of rapid and effective on-site treatment strategies, ranging from conservative measures (compression, vasoconstrictors, nasal packing) to procedural interventions like cautery. Prevention strategies, such as nasal lubrication and environmental humidity control, also play a crucial role in reducing recurrence. It is worth noting that although many treatment modalities are effective, no single method guarantees complete resolution, especially in recurrent or trauma-related cases. Therefore, individualized approaches and specialist consultation remain key.

Allergic rhinitis, though non-traumatic, is another major nasal condition affecting athletes, with a particularly high incidence among elite competitors. Its typical onset during adolescence or young adulthood coincides with the peak years of athletic performance. The review emphasizes that allergic rhinitis symptoms—congestion, sneezing, rhinorrhea, and ocular irritation—can significantly impair sleep, concentration, and respiratory efficiency, all of which are vital for high-level sports performance.

Management of allergic rhinitis in athletes must strike a balance between efficacy and compliance, especially given anti-doping concerns. Evidence supports the use of nasal corticosteroids as first-line therapy, with antihistamines and combination sprays offering valuable adjunctive options. Non-pharmacological measures, particularly nasal saline irrigation and allergen avoidance, also have proven benefit and are generally well tolerated. However, inconsistent symptom control, overlapping environmental triggers, and the risk of over-reliance on medications may hinder optimal outcomes. For athletes with persistent or severe symptoms, referral for allergen-specific immunotherapy is justified and could offer long-term benefit.

Conclusions.

Nasal conditions such as epistaxis and allergic rhinitis are prevalent and clinically relevant in athletic populations, with implications that extend beyond discomfort to potential performance impairment, injury risk, and loss of competition eligibility. This review demonstrates that while anterior epistaxis is most often trauma-induced and manageable with prompt intervention, it requires careful evaluation to exclude more serious injuries like nasal fractures or septal hematomas. Conversely, allergic rhinitis—though less acute—is a chronic condition that demands tailored, often multifaceted management strategies to prevent its detrimental impact on physical and cognitive performance.

Ultimately, improved awareness, timely recognition, and the application of evidence-based, sport-specific treatment protocols are essential for clinicians, coaches, and athletes alike. Further research is warranted to better understand the long-term outcomes of nasal injuries in sport and to optimize therapeutic approaches for allergic rhinitis, particularly in elite and youth athletes.

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The authors report that they have no conflicts of interest.

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