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Exercise-Induced Laryngeal Obstruction in Athletes with Exertional Dyspnoea: A Narrative Review of Diagnostic Challenges, Management and Sport Participation

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Abstract

Background. Exercise-induced laryngeal obstruction (EILO) is a transient, exercise-triggered narrowing of the laryngeal inlet that may mimic asthma and exercise-induced bronchoconstriction (EIB). In athletes, this confusion delays mechanism-specific assessment and may lead to unnecessary lower-airway treatment.

Aim. To synthesise current evidence on EILO in athletes with exertional dyspnoea, focusing on differentiation from EIB and asthma, continuous laryngoscopy during exercise (CLE), management and sport participation.

Materials and methods. PubMed/MEDLINE, Google Scholar, the Cochrane Library, ClinicalTrials.gov and reference lists of key papers were searched from database inception to 10 May 2026, restricted to publications in English and Polish. Consensus statements took precedence, followed by guidelines, CLE studies and intervention trials.

Results. Inspiratory, noisy breathlessness at peak workload with rapid recovery suggests EILO but does not confirm it. Asthma and EIB require lower-airway testing, whereas EILO is best confirmed by CLE during symptom-reproducing exercise. Strong conclusions emerge only when timing, exertion level, symptom pattern, site of obstruction and degree of closure align coherently. Non-surgical approaches rest largely on limited observational data, with one recent randomised trial showing no difference between video biofeedback and respiratory retraining in broader inducible laryngeal obstruction populations. Supraglottoplasty is reserved for severe supraglottic disease refractory to conservative management.

Conclusions. EILO is a distinct upper-airway mechanism. Diagnostic evidence is stronger than treatment and return-to-sport evidence. Treatment decisions and sport reporting should reflect symptom–mechanism concordance and sport-specific tolerance.

Keywords: exercise-induced laryngeal obstruction; athletes; exertional dyspnoea; continuous laryngoscopy during exercise; exercise-induced bronchoconstriction; asthma.

1. Introduction

Exertional dyspnoea is a frequent complaint among athletes, and asthma or exercise-induced bronchoconstriction (EIB) are commonly the first conditions considered. This assumption makes sense when lower-airway disease is biologically plausible. Yet breathlessness stands as a symptom, not an anatomical diagnosis. Identifying it does not point directly to one cause. A similar complaint may follow from lower-airway narrowing, laryngeal obstruction, dysfunctional breathing, cardiovascular pathology, anaemia, environmental exposure or deconditioning. Often, more than one factor combines behind the symptom [1–3].

Most cases of exercise-induced laryngeal obstruction (EILO) fall under a larger group known as inducible laryngeal obstructions, happening when physical activity causes narrowing at the glottic, supraglottic or mixed level. The clinical picture that should raise suspicion is

straightforward. What stands out in active individuals is often a feeling of being unable to draw air in, neck or throat tightness, choking, audible inspiratory noise, an abrupt limitation at high intensity, or rapid relief after stopping [4–6]. Since symptoms only appear with exercise, standard checkups done at rest - such as resting laryngoscopy - might show nothing unusual, despite clear issues emerging during intense training [7].

What makes this difference relevant in routine care? The presumed cause shapes which test comes next. EIB is a lower-airway phenomenon and is confirmed by serial lung-function measurement following exercise, or by an appropriate bronchoprovocation surrogate.

For symptoms rooted higher up, like EILO, seeing the direct visualisation of laryngeal behaviour during exercise becomes key [8,9]. Overlap between these two conditions is not rare. Evidence shows both can exist at once. Confirming one mechanism does not remove the need to evaluate the other when the symptom picture remains incompletely explained [10].

The aim of this review is to summarise current evidence on EILO in athletes presenting with exertional dyspnoea, with particular focus on diagnostic confirmation, the limitations of available treatment data and sport-participation outcomes that can be reported without overstating the underlying evidence base. Compared with earlier athlete-focused summaries, the present review incorporates evidence published after the 2022 IOC consensus statement and the accompanying BJSM narrative review on EILO in athletes [1,5], including recent data on laryngeal behaviour in asymptomatic athletes, a standardised speech-therapy protocol with prospective outcomes, and the first randomised controlled trial conducted in an inducible laryngeal obstruction population [23,25–28,34].

2. Materials and methods

This article is a narrative literature review focused on exercise-induced laryngeal obstruction in athletes with exertional dyspnoea. The guiding clinical question was formulated before the search: what does the current literature show about recognition, differential diagnosis, objective confirmation, management and sport-specific consequences of EILO in physically active and athletic populations?

PubMed/MEDLINE served as the primary database, supplemented by Google Scholar, the Cochrane Library, ClinicalTrials.gov and reference lists of key papers. Searches were performed from database inception to 10 May 2026 and were restricted to publications in English and Polish. Search terms included exercise-induced laryngeal obstruction, vocal cord dysfunction, inducible laryngeal obstruction, exertional dyspnoea, asthma, exercise-induced

bronchoconstriction, continuous laryngoscopy during exercise, inspiratory muscle training, speech therapy and return to sport. A representative search combination was: ("exercise-induced laryngeal obstruction" OR "vocal cord dysfunction") AND (athlete* OR sport*) AND (diagnosis OR laryngoscopy OR "return to sport").

Priority was given to consensus statements, clinical guidelines, CLE studies, athlete or adolescent cohorts, methodologically explicit reviews and intervention studies. Sources were included when they addressed EILO definition, clinical presentation, differentiation from asthma or EIB, diagnostic confirmation, management strategies or sport-participation outcomes. Older publications were retained when they described foundational methods, terminology or diagnostic principles. Papers were excluded when they were not clinically relevant to exercise-related laryngeal obstruction, did not address exertional symptoms, or provided only general discussion without clear relevance to the aims of this review. No formal systematic review protocol, risk-of-bias assessment or meta-analysis was performed, because the design is that of a narrative review.

3. Results

3.1. Definition and terminology

When physical activity brings on breathing issues, it might be EILO - inducible laryngeal obstruction made visible during exertion. Current terminology highlights what triggers the problem, where it occurs in the airway, and whether it happens when inhaling or exhaling. This shift moves away from older labels like vocal cord dysfunction or paradoxical vocal fold motion. Such older labels often exaggerate how much the vocal folds are involved. They also tend to overlook cases involving supraglottic or mixed patterns [9,11].

When explaining symptoms tied to physical activity, clinicians ought to apply the label EILO only if exertion causes laryngeal obstruction - then add an explicit anatomical descriptor (glottic, supraglottic, or both). Knowing where exactly trouble occurs matters during assessment, guides therapy decisions, and influences whether surgery becomes a likely option. Still, the current evidence lacks strength enough to support strict rules linking each subtype to specific therapies in athletes.

Though reported prevalence varies widely, methodological differences explain this variation: studies differ in age range, sex distribution, physical activity type, reported symptoms, referral pathway, testing methods, and what defines a positive result. In teens from regular populations,

both EILO and EIB play roles in exercise-related respiratory complaints. Yet among athletes or those already struggling, EILO appears more often [12-14]. Most research focuses on endurance and winter sports - most likely because high ventilation, cold or dry inspired air, and repeated near-maximal efforts together expose respiratory limitation. Adolescents, young adults and female athletes are over-represented, but those demographic patterns should raise suspicion rather than exclude EILO in other groups [5,15].

Clinical suspicion grows when symptoms mainly occur during inhalation, are localised to the throat or neck, are accompanied by stridor or a high-pitched inspiratory noise, arise abruptly at peak or near-peak intensity, and resolve quickly after stopping. Individually, none of these signs is diagnostic. Some athletes describe breath issues using non-specific terms - like wheezing, tightness, or even "asthma" - even when their physiological responses differ. Because descriptions can mislead, what patients report helps shape which tests make sense, yet never replaces actual measurements [5,8,13].

3.2. Mechanism-based differential diagnosis

Although EILO, asthma and EIB may present with similar exercise-related symptoms, they arise from distinct mechanisms. Asthma is defined by chronic airway inflammation and variable expiratory airflow limitation. EIB is transient lower-airway narrowing triggered by exercise or hyperpnoea. EILO, in contrast, is an upper-airway disorder characterised by glottic, supraglottic or mixed laryngeal narrowing during vigorous exercise [8,9,15–17].

One reason EIB may be missed is the limited reliability of symptom patterns. Objective confirmation relies on repeated post-exercise lung-function measurements or an appropriate challenge, with a fall in FEV_1 of 10% or more from baseline considered diagnostic [8]. Resting spirometry may support an asthma diagnosis but can be normal between episodes, does not exclude EIB and provides no information about laryngeal behaviour. Sport-focused reviews consistently caution against diagnosing exercise-related breathing problems on symptoms alone [16,17].

When the symptom pattern suggests EILO, the preferred approach is continuous laryngoscopy during exercise (CLE), ideally performed under conditions that reproduce the patient's typical symptoms. A normal resting laryngoscopy does not exclude EILO, because narrowing may appear only at high ventilatory demand and resolve rapidly after exercise cessation [5,7]. Additional differential considerations include syncope, chest pain, palpitations, systemic

allergic features, recent infection, anaemia risk, rhinitis, gastro-oesophageal reflux and marked dysfunctional breathing [2,18].

Table 1 summarises the mechanism-based orientation in athletes with exertional dyspnoea.

Clinical clue or test issue	More consistent with EILO	More consistent with EIB / asthma	Implication
Dominant breathing phase	Inspiratory difficulty, stridor, "cannot get air in".	Expiratory wheeze, cough, chest tightness or prolonged post-exercise breathlessness.	Use symptoms to choose tests, not to make a diagnosis.
Timing	Peak or near-peak exercise; abrupt limitation; rapid recovery after stopping.	Often during or after sustained intense exercise; recovery may be slower without treatment.	Reconstruct the typical episode and sport context.
Objective confirmation	CLE during symptom-reproducing exercise, with anatomical reporting.	Serial FEV_1 after exercise or surrogate bronchoprovocation; asthma assessment when indicated.	Select the test according to the suspected anatomical mechanism.
Resting tests	Often normal; resting laryngoscopy does not exclude EILO.	Resting spirometry may be normal between episodes and does not exclude EIB.	Normal resting tests should not end evaluation if sport-limiting symptoms persist.
Coexistence	May coexist with EIB / asthma, especially when residual symptoms remain inspiratory or throat-localised.	May coexist with EILO when lower-airway testing is positive but symptoms are not fully explained.	Avoid a forced asthma-versus-EILO dichotomy.

Table 1. *Mechanism-based orientation in athletes with exertional dyspnoea, synthesised from current EILO and EIB literature [5,8–10,16,17].*

3.3. CLE testing and interpretation

CLE allows direct visualisation of laryngeal behaviour as exercise intensity increases and as symptoms occur. Unlike still images, it captures dynamic changes in airway closure - glottic, supraglottic or mixed - together with their timing in relation to exertion and reported discomfort [7,19–21]. In athletes, this temporal alignment is essential, because the event that genuinely

limits performance often appears only at race pace, during repeated intervals or during sport-specific surges in ventilation.

The diagnostic value of CLE depends on interpretation within a physiological framework rather than on use as a binary screen. A clinically useful CLE report should specify the type and intensity of exercise performed, the workload achieved, whether the athlete's typical symptoms were reproduced during exertion, and the precise phase of the respiratory cycle in which obstruction occurred. It should also identify the anatomical level of narrowing, its severity, its temporal concordance with symptoms and whether the observed obstruction plausibly accounts for performance limitation. Reporting these elements reduces both the risk of missing genuine pathology because of inadequate stress testing and the risk of overdiagnosis based on incidental narrowing. Although standardised scoring systems improve reproducibility, interpretation remains observer-dependent, and inter-rater variability has been documented [21,22].

Recent data caution against interpreting visible narrowing in isolation. Healthy endurance athletes may exhibit supraglottic narrowing during intense exercise in the absence of any respiratory complaint, while isolated glottic obstruction was not observed in the asymptomatic cohort described by Carlsen et al. [23]. Robust diagnosis therefore requires concordance between anatomical findings, recurrent symptoms and a clinical narrative that explains performance limitation more coherently than alternative explanations.

3.4. Management evidence

Although management strategies are commonly described as mechanism-specific, the underlying evidence base remains uneven. Confirmation of an upper-airway mechanism by CLE identifies a likely contributor but does not, by itself, predict which therapy will be effective across patients. Treatment decisions should consider anatomy, symptom severity, sport-specific demands, coexisting asthma or EIB, dysfunctional breathing patterns, rhinitis or reflux, prior response to therapy and access to specialist services [5,9].

3.4.1. Education and self-management

Education is widely considered foundational to care, although it is rarely studied as an isolated intervention. Its practical role includes explaining that EILO appears only during physical effort and distinguishing it from uncontrolled asthma, deconditioning or panic. Identifying the sports and tasks that reproducibly provoke episodes helps to shape individualised responses. Inhalers are justified only when lower-airway disease has been objectively demonstrated or clinically

established. Advice on continued training or modification should remain individualised and linked to safety screening and reproducibility of symptoms [5,8–10,16].

3.4.2. Speech therapy and laryngeal control techniques

Speech therapy is supported by one of the more developed conservative frameworks for EILO. The athlete-specific Olin EILOBI techniques and structured speech-language pathology interventions share the rationale of maintaining laryngeal patency, reducing maladaptive inspiratory effort and providing rescue manoeuvres during high ventilatory demand [24]. Building on this rationale, Karlsen et al. described a standardised speech-therapy protocol developed to improve reproducibility across centres [26], and the subsequent prospective study by Vreim et al. reported reduced CLE scores and fewer exercise-related symptoms after speech therapy in most participants, with improvement seen primarily at the glottic level [27]. In an athlete-specific cohort, Fujiki et al. similarly reported reduction of EILO symptoms following speech-language pathology intervention in teenage athletes [25]. Collectively, this body of work supports speech therapy as a reasonable first-line option, although head-to-head comparisons are lacking and the athlete subgroups most likely to benefit have not been identified.

3.4.3. Breathing retraining, biofeedback and inspiratory muscle training

Several non-invasive approaches have been described in the EILO literature: breathing retraining, biofeedback, physiotherapy-based programmes and inspiratory muscle training (IMT). Unlike speech therapy, which targets laryngeal control directly, these interventions act on adjacent contributors - ventilatory pattern, respiratory muscle capacity, postural and musculoskeletal loading, and proprioceptive awareness during high-intensity exertion. Much of the supporting evidence comes from reports without comparator groups or long-term follow-up. The first randomised controlled trial in this population, conducted in broader inducible laryngeal obstruction cohorts, compared video biofeedback with respiratory retraining and found that both groups improved without a statistically significant between-group difference [28]. Because the trial population was not athlete-specific, the result supports individualised selection rather than any claim that one conservative intervention is preferred. IMT has been examined in athletic EILO cohorts and may reduce symptoms and improve CLE scores in selected patients, although responses are heterogeneous and the underlying mechanism may differ according to whether obstruction is glottic or supraglottic [29,30]. Physiotherapy-based or multidisciplinary care has been described for athletes with overlapping dysfunctional

breathing, cervical or shoulder tension, postural compensation or fear-avoidance of high-intensity work; current data support such programmes as plausible rather than definitively effective [31].

3.4.4. Pharmacological treatment

Pharmacological treatment plays a limited role in isolated EILO, because the primary lesion is mechanical upper-airway obstruction rather than lower-airway bronchoconstriction. Bronchodilators, inhaled corticosteroids and other asthma or EIB medications are appropriate only when lower-airway disease has been objectively confirmed or clinically established. Persistent symptoms despite appropriate medical therapy should prompt reassessment of the underlying mechanism rather than automatic escalation of asthma treatment. In athletes, prescribing decisions should also take into account World Anti-Doping Agency regulations and Therapeutic Use Exemption requirements, since empirical asthma treatment without objective lower-airway evidence may be both clinically unhelpful in isolated EILO and procedurally inappropriate from an anti-doping perspective [16].

3.4.5. Surgical management

Surgery is generally reserved for specific situations, primarily severe supraglottic obstruction with persistent symptoms despite adequately tried conservative treatment. Observational reports describe improvement in carefully selected individuals, but these findings do not extend reliably to glottic EILO, mild mixed obstruction or uncertain diagnoses [32,33]. The decision to consider supraglottoplasty depends on anatomical pattern, severity, refractoriness to conservative care, and multidisciplinary assessment that incorporates the athlete's informed preference regarding sport continuation.

3.5. Sport participation and performance implications

There is currently no widely accepted method for clearing athletes with EILO for sport. A more defensible practical approach is to describe whether the athlete tolerates the ventilatory demand that reproducibly provokes symptoms. Symptoms typically appear near peak intensity and resolve quickly after exercise cessation [5]. EILO may be missed when the testing protocol or clinical review does not reproduce the athlete's habitual load [5,7]; symptom-free low-intensity activity is therefore weak evidence of resolution in an athlete whose limitation is restricted to sprinting, repeated intervals, climbing, skating, swimming bouts or competition-specific surges.

Available evidence does not justify a single return-to-sport rule. Continued activity may be appropriate when symptoms are typical for EILO, when no red flags are present and when competing cardiopulmonary or systemic causes have been considered. Modification of training intensity or environment is more strongly justified when episodes involve marked distress, panic-like escalation, unsafe interruption of training, syncope, chest pain, oxygen desaturation, suspected anaphylaxis or unexplained loss of performance. The relevant clinical question is not whether EILO alone disqualifies an athlete from sport, but whether the observed laryngeal mechanism adequately explains the episode and whether an alternative diagnosis would alter risk management [1,2,5].

A sport-focused assessment is most useful when it characterises the event that limits the athlete: exercise mode, intensity, duration, environmental exposure, recovery time, audible noise, breathing phase, medication use and capacity to regain control without complete cessation of activity. This level of detail is consistent with the recognised overlap between EILO and EIB or asthma, and with the tendency of athletes to use identical descriptors - wheeze, tightness, “an attack” - for physiologically distinct events [8–10,16,17].

Treatment response is best expressed as functional tolerance rather than as a single symptom score. Although speech therapy, laryngeal control techniques, biofeedback, physiotherapy and IMT may reduce symptoms in selected athletes, the evidence base is heterogeneous and only partly athlete-specific [24–31]. Return to full training is therefore most informatively described as a monitored progression in ventilatory demand, with recurrences and sport-specific triggers documented, rather than as a fixed count of symptom-free days.

Follow-up should distinguish improvement in perceived control from anatomical normalisation. A reduction in CLE score after treatment is supportive when symptoms and functional capacity also improve, but repeated CLE is not required in every patient. It is most useful when symptoms persist despite appropriate management, when the initial test failed to reproduce the typical episode, when surgery is being considered, when the symptom pattern changes, or when high-stakes performance decisions depend on objective reassessment. This caution is reinforced by data showing supraglottic narrowing in asymptomatic endurance athletes and by longitudinal data indicating that CLE scores tend to be stable but are not entirely invariant over time [23,34].

For both research and clinical reporting, sport-related outcomes are most informative when they include sport, competitive level, provoking task, symptom threshold, ability to complete

repeated high-intensity efforts, recurrence in the usual training environment, use of rescue strategies, asthma or EIB medication use, interruption of training, competition participation and athlete confidence. These domains are outcome descriptors rather than formal clearance criteria, and their consistent use would make reporting more comparable across studies and less dependent on vague statements such as “returned to sport”.

4. Discussion

Although asthma and EIB are common considerations in athletes with exertional dyspnoea, EILO is a clinically relevant and frequently under-recognised contributor when breathlessness occurs during physical effort. The available evidence does not support replacing asthma or EIB with EILO in clinical reasoning; rather, it supports a mechanism-based evaluation in which symptoms - wheeze, tightness, choking, “an attack” - guide test selection without functioning as diagnostic endpoints in their own right. Patient descriptions are most informative when linked to measurable airway behaviour [1,5,8–10,16].

A central message of the literature is that EILO and EIB rely on distinct testing strategies. EIB requires demonstration of a lower-airway response following exercise or an appropriate challenge, whereas suspected EILO calls for CLE during symptom-reproducing exercise. CLE is central to the diagnostic discussion in this review, and its interpretation requires caution. A CLE result is most persuasive when the athlete reaches a clinically relevant intensity, when typical symptoms are reproduced and when the anatomical pattern and severity plausibly explain the observed limitation. Holding the test to this standard reduces the risk of overdiagnosis based on incidental narrowing - a concern reinforced by data showing that some endurance athletes exhibit supraglottic narrowing without respiratory complaints [23]. Diagnostic decisions should therefore be matched with sport-specific function rather than based on imaging findings alone.

Athletes with evidence of both EILO and EIB or asthma deserve particular attention in sports practice, because this overlap is plausible and clinically consequential. Although obstruction occurs at different airway levels, high ventilation, dry or cold inspired air and repeated near-maximal effort may produce overlapping subjective descriptions even when the anatomical sites of obstruction are distinct [10,16]. Two implications follow. First, even when tests confirm EIB, clinicians should remain alert to possible upper-airway involvement whenever an athlete describes throat tightness, inspiratory difficulty or limitation restricted to maximal intensity, particularly if these features persist despite appropriate asthma treatment; suspicion should then

shift toward EILO rather than automatic escalation of bronchodilator or inhaled corticosteroid therapy. Second, laryngeal narrowing on CLE does not rule out coexisting bronchial disease when the symptom pattern also includes expiratory wheeze, prolonged post-exercise breathlessness, atopic features or measurable airway hyperresponsiveness. The current literature supports treating these causes as potentially coexisting rather than mutually exclusive. When one diagnosis is established but the clinical picture remains incompletely explained, the second mechanism should be actively considered before further therapeutic escalation [5,10,16,17]. This approach prevents the common pitfall of attributing all persistent breathlessness to "refractory asthma" in an athlete whose true limitation is laryngeal, and the symmetrical pitfall of dismissing residual expiratory symptoms once EILO has been confirmed.

Treatment evidence lags behind diagnostic evidence. Although education, breathing retraining, biofeedback, speech therapy, physiotherapy-based care and IMT are physiologically plausible, their relative value remains unclear. The most defensible interpretation supports individualised conservative care, restricted use of lower-airway medication to objectively supported or clinically established lower-airway disease, and consideration of surgery only for selected severe supraglottic EILO refractory to adequately tried conservative treatment [5,24–33].

Although symptom relief is important, focusing on it alone misses broader needs in sport-specific recovery, and clear benchmarks for safe return remain unproven. Many existing studies report symptoms or CLE scores in isolation, whereas athletes and clinicians also require information on tolerance of high-intensity work, recurrence in the provoking environment, confidence at maximal effort, medication use and sustained capacity for sport-specific triggers. Without uniform reporting of activity type, competitive level, anatomical pattern, lower-airway assessment, intervention adherence, recurrence and return-to-performance outcomes, progress in this field will remain fragmented [5,23,34].

4.1. Limitations

Current inferences remain constrained by the available data. Nomenclature, differential diagnosis and objective testing are supported considerably more strongly than treatment or sport-participation recommendations. Intervention evidence tends to come from specialist centres, small cohorts, retrospective analyses, mixed phenotypes and heterogeneous outcomes. Future studies require controlled designs, standardised CLE reporting, sport-specific exercise protocols and outcomes that capture training continuity, recurrence, athlete confidence and return to competition, rather than only symptom counts at rest.

5. Conclusions

EILO deserves active consideration in athletes with exertional dyspnoea, particularly when breathlessness is predominantly inspiratory, throat- or neck-localised, audibly noisy, triggered near peak exercise and rapidly relieved by cessation. These features should be treated as clinical signals rather than as diagnostic proof, and each case requires objective assessment before a final explanation is accepted.

Diagnosis is most coherently framed by physiological mechanism. Asthma and EIB call for objective lower-airway testing, whereas suspected EILO is most directly evaluated by CLE during exercise that reproduces the typical symptoms. Because EILO and EIB or asthma may coexist, confirmation of one mechanism does not necessarily account for the full clinical picture when discordance persists.

Management decisions should remain individualised and proportionate to the strength of the available evidence. Conservative approaches rest mainly on physiologically plausible mechanisms, accumulated clinical experience and observational data, while controlled comparisons remain scarce. For supraglottoplasty, research support is more limited, justifying its use only in carefully selected cases of severe supraglottic EILO refractory to conservative treatment.

For athletes specifically, successful care is captured more completely by tolerance of sport-specific ventilatory demand than by symptom reduction alone. Clinical and scientific reporting is most informative when it documents sport, competitive level, provoking task, objective test concordance, intervention adherence, recurrence, medication use, training continuity, competition participation and athlete confidence - while avoiding causal claims stronger than the evidence will bear.

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