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Confidence Is Not Competence: The Dunning-Kruger Effect in Difficult Airway Management

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Abstract

Airway management is a high-stakes domain in which most difficulty is unanticipated and failure can be rapidly lethal. Under these conditions, the clinician's ability to judge their own performance becomes a critical safety mechanism. The Dunning-Kruger effect describes a metacognitive bias in which people with limited competence overestimate their performance because the skills needed to perform well are the same skills needed to recognize poor performance.

This narrative review places the effect within the broader literature on cognitive bias and clinical reasoning, summarizes the original evidence and its methodological critiques, and examines studies of self-assessment accuracy among physicians and anesthesiologists. It then maps the bias onto recognized failure modes in difficult airway management, including overconfident prediction, fixation, repeated intubation attempts, delayed transition between rescue plans, reluctance to call for help, misplaced reassurance from video laryngoscopy, and the silent decay of rarely used rescue skills.

The available evidence, much of it indirect, suggests that confidence is an unreliable proxy for airway competence across career stages. Mitigation therefore depends less on individual insight than on external structures: structured planning, counted attempts, cognitive aids, objective assessment, simulation with expert debriefing, deliberate practice, and a team culture in which declaring difficulty is expected rather than exceptional. Implications for training programs, credentialing, and future research are discussed.

Categories: Psychology, Medical Education, Anesthesiology
Keywords: airway management, cognitive bias, difficult airway, dunning-kruger effect, human factors, metacognition, patient safety, self-assessment

Introduction And Background

Airway management is a defining skill of the anesthesiologist, and its failure remains a leading cause of anesthesia-related death and hypoxic brain injury. The Fourth National Audit Project (NAP4) of the Royal College of Anaesthetists and the Difficult Airway Society reviewed 184 major airway events across anesthesia, intensive care, and the emergency department and repeatedly identified poor assessment, poor planning, and poor judgment as contributors [1]. Structured follow-up interviews with 12 reporting anesthetists identified contributing human factors in every case, most often failures of situation awareness [2].

These findings echo a wider recognition that many adverse events in medicine arise not from a lack of knowledge but from flaws in how clinicians think. Overconfidence has been identified as a major contributor to diagnostic error across specialties [3], and a review of cognitive errors in anesthesiology catalogued biases such as anchoring, premature closure, and sunk-cost reasoning that are directly relevant to the management of acute crises [4]. In airway emergencies, these failures often share a single feature: the clinician did not recognize that the situation, or their own performance within it, was deteriorating. This is a metacognitive problem, a failure of knowing what one does not know.

The problem is compounded by the unpredictability of difficulty. In a Danish registry cohort of 188,064 patients, 93% of difficult intubations and 94% of difficult mask ventilations were unanticipated, and only about a quarter of anticipated difficult intubations proved difficult [5]. When prediction is this poor, the clinician’s internal sense of how things are going becomes the main safety mechanism. If that sense is systematically biased, the safety mechanism fails silently.

The Dunning-Kruger effect, first described by Kruger and Dunning in 1999, refers to the tendency of people with limited competence in a domain to overestimate their own ability. Its central insight is that the knowledge and skills needed to perform a task well are the same ones needed to judge whether it has been performed well. The effect is therefore more specific than general overconfidence, which can affect

clinicians at any level of skill and in any situation. It is also distinct from impaired situation awareness, which refers to a failure to perceive or interpret what is happening in the environment, such as falling oxygen saturation or the passage of time. The Dunning-Kruger effect concerns a failure to judge one's own performance accurately, and it can coexist with and amplify both overconfidence and impaired situation awareness. A clinician who lacks expertise in managing a difficult airway may thus also lack the expertise to recognize, in real time, that their own attempts are failing.

The consequences of such delayed recognition are severe and rapid. When a patient cannot be intubated or adequately ventilated, oxygen reserves are exhausted within minutes, particularly in patients who are obese, pregnant, critically ill, or children. Continued attempts at intubation during this period can cause airway swelling and bleeding, making rescue progressively harder, and may convert a manageable difficulty into a "cannot intubate, cannot oxygenate" emergency. Without timely transition to rescue techniques, the result can be hypoxic brain injury, cardiac arrest, or death.

This narrative review examines one such bias, the Dunning-Kruger effect, in the context of difficult airway management. It first situates the effect within the broader literature on metacognition and cognitive bias, then reviews the evidence for the effect and its critiques, the accuracy of self-assessment among physicians and anesthesiologists, and the ways in which the bias manifests during the planning and management of difficult airways. Finally, it considers practical countermeasures at the level of the individual, the team, and the institution, and their implications for training and credentialing.

Review

Literature search and selection

This narrative review was based on a structured but non-systematic search of the literature. PubMed and Google Scholar were searched from inception to October 2026 using combinations of the following terms joined by Boolean operators: ("Dunning-Kruger effect" OR "self-assessment" OR "metacognition" OR "overconfidence" OR "cognitive bias") AND ("airway management" OR "difficult airway" OR "tracheal intubation" OR "anesthesia" OR "anaesthesia"); and ("simulation" OR "competency assessment" OR "skill retention") AND ("difficult airway" OR "cricothyroidotomy"). The reference lists of key guidelines and reviews were hand-searched for additional publications. Only articles published in English were considered; no restrictions were placed on publication date or study design.

Publications were included if they (i) described the Dunning-Kruger effect or its methodological critiques, (ii) compared self-assessed with objectively measured competence among physicians or trainees, (iii) addressed cognitive bias, human factors, or decision-making in airway management, or (iv) represented current society guidelines or higher-level evidence (systematic reviews, meta-analyses, or randomized trials) on difficult airway prediction, management, training, or skill retention. Conference abstracts and studies unrelated to self-assessment, cognition, or airway management were excluded. Selected commentaries and expert reviews were included where they provided conceptual or clinical context.

The evidence was synthesized narratively and organized thematically. No formal risk-of-bias or quality assessment of individual studies was performed. Because no study has directly measured the Dunning-Kruger effect in clinicians managing real difficult airways, the review draws on three levels of evidence: direct studies of self-assessment accuracy in airway management, studies of self-assessment and cognitive bias in other areas of medicine, and evidence from psychology and human factors research, which is extrapolated to the airway context. Where an argument relies on indirect or extrapolated evidence, this is indicated in the text.

Metacognition and cognitive bias in clinical decision-making

Metacognition, the ability to monitor and regulate one's own thinking, is central to safe clinical practice. Dual-process models of clinical reasoning distinguish a fast, intuitive mode of thinking, which relies on pattern recognition, from a slower, analytical mode that is deliberate and effortful [6]. Experienced clinicians handle most routine work intuitively, which is efficient and usually accurate. Errors arise when the intuitive mode is applied to a situation it does not fit, and the clinician fails to notice the mismatch. In Croskerry's model, analytical reasoning can override an intuitive response, but only if the clinician first recognizes that an override is needed [6].

Airway management places unusual strain on this mechanism. The great majority of intubations are uneventful and are performed largely by pattern recognition. When difficulty does arise, it often develops within minutes, under time pressure, high stress, and progressive hypoxemia, conditions in which analytical reasoning is hardest to sustain. The clinician must recognize, while still performing the task, that the usual pattern no longer applies.

Several cognitive biases described in the medical and anesthesia literature are particularly relevant to airway management (Table *1*) [3,4,6].

Bias	Description	Example in airway management	Link to the Dunning-Kruger effect
Overconfidence	Confidence in a judgment exceeds its accuracy	Omitting a backup plan because the airway “looks easy”	The core feature: limited skill hides the need for a plan
Anchoring	Fixing on an initial impression despite new information	Persisting with an “easy airway” assumption after a failed first laryngoscopy	Limited expertise reduces recognition of disconfirming cues
Sunk-cost and plan continuation	Persisting with a course of action because of effort already invested	“One more attempt” after repeated failed laryngoscopies	The clinician cannot judge that further attempts are futile
Premature closure	Accepting an explanation before it is verified	Attributing falling saturation to a probe artifact rather than esophageal intubation	Inadequate knowledge narrows the range of explanations considered
Availability	Judging likelihood by recent or memorable cases	A run of easy intubations lowers vigilance for the next patient	Routine success inflates confidence without testing competence
Confirmation bias	Seeking evidence that supports the current belief	Accepting chest movement or tube misting while discounting absent capnography	Poor monitoring of one’s own reasoning allows selective interpretation

TABLE 1: Cognitive biases relevant to difficult airway management and their relationship to the Dunning-Kruger effect

This table was created by the authors, based on information synthesized from references [3,4,6].

These biases distort reasoning in different ways, but they share a common vulnerability: each would be detected and corrected if the clinician could accurately monitor their own performance. The Dunning-Kruger effect is important because it describes a failure of exactly this monitoring function. It is not simply one more bias in the list; it helps explain why the others can persist unnoticed.

Overconfidence deserves particular attention. In a broad review of diagnostic error, Berner and Graber argued that physicians are often unaware of their own errors, that confidence and accuracy are only weakly related, and that complacency and limited feedback allow miscalibration to persist [3]. Many clinicians receive little systematic information about the outcomes of their decisions, so that errors are rarely corrected. The same is true of airway management, where a difficult intubation that is eventually successful may be remembered as a success rather than as a near miss.

The Dunning-Kruger effect

In 1999, Kruger and Dunning tested undergraduates on humor, logical reasoning, and English grammar, then asked them to estimate their own performance [7]. Participants scoring in the bottom quartile, around the 12th percentile, estimated themselves to be near the 62nd. Top performers slightly underestimated their relative standing, partly because they assumed others found the tasks as easy as they did.

The authors proposed a “dual burden”: incompetence deprives people both of the ability to produce correct answers and of the ability to recognize that their answers are wrong. Crucially, when low performers were given training in the relevant skill, their self-assessments became more accurate, suggesting that the bias is a consequence of the skill deficit rather than a fixed personality trait [7].

Subsequent work extended these findings beyond the laboratory. Ehrlinger et al. observed the same pattern in real-world settings, including a classroom examination, a college debate tournament, and a test of firearm safety knowledge among gun owners at a trap and skeet shooting competition, and found that poor performers continued to overestimate their performance even when offered incentives for accurate self-assessment [8]. This suggests that the inflated estimates reflect a genuine lack of insight rather than mere self-presentation.

Methodological Critiques

The effect is widely cited and widely misunderstood, and its limitations deserve acknowledgment.

Regression to the mean and the better-than-average effect: If self-estimates are noisy and most people rate themselves above average, plotting self-estimate against actual quartile will reproduce the classic pattern even without any metacognitive deficit [9].

Statistical artifact: Simulation studies show that random noise alone can reproduce the classic graphical pattern [10], and reanalyses using methods that avoid these artifacts have found the effect to be much smaller than the original figures suggest, with some authors concluding that it is mostly artifactual [11].

Evidence for a genuine component: Other work, including Bayesian modeling of large replication datasets, supports a real, if modest, tendency for low performers to be less able to judge whether their own answers are correct [12].

The defensible position is that self-assessment is generally poorly correlated with performance, and that low performers have the least capacity to recognize their errors. For patient safety, the practical conclusion is the same whichever interpretation prevails: a clinician's confidence cannot be trusted as a measure of their competence.

Self-assessment in medicine and anesthesiology

A systematic review of physician self-assessment found that, in most comparisons, self-rated competence showed little or no relationship to external measures of performance [13]. Notably, several included studies found the poorest self-assessment accuracy among the least skilled physicians and among the most confident, exactly the pattern Dunning and Kruger described.

Eva and Regehr reached a similar conclusion from a broad review of the health professions literature. They argued that self-assessment, in the sense of an unaided global judgment of one's own ability, is generally inaccurate and should not be relied upon as the basis for professional learning or regulation, and that clinicians should instead actively seek external information about their performance [14].

The Dunning-Kruger pattern has also been observed directly in medical trainees. Hodges et al. asked first-year family medicine residents to rate their own performance in a difficult "breaking bad news" interview with a standardized patient. The lowest-performing residents overestimated their performance and, after viewing benchmark videos of the same scenario, corrected their self-ratings far less consistently than their higher-performing peers [15]. A study of junior medical officers similarly found that self-reported confidence in common clinical procedures showed no correlation with observed competence, and some participants performed at an inadequate level [16]. These findings have prompted calls for training programs to treat trainee confidence with caution and to give more weight to assessments by faculty, peers, patients, and staff than to self-assessment [17].

Experience alone does not correct the problem. In an early study of cardiopulmonary resuscitation, clinical experience without performance feedback increased doctors' confidence but not their skill [18]. Airway management is vulnerable to the same trap. Most intubations are straightforward, so routine practice delivers repeated success and steadily rising confidence, while the rare difficult airway, the event that actually tests competence, may be encountered only a few times a year.

Airway-specific data support this concern. Bessmann et al. used an adaptive e-learning program with 103 questions to compare subjective confidence with objective knowledge among 191 Danish anesthesiologists [19]. At the domain level, confidence and test scores were correlated, which is reassuring. At the item level, however, important gaps appeared. Only 28.8% answered correctly on obstructive sleep apnea as a predictor of difficult airway management, and 33.5% of answers on this topic were both wrong and given with confidence ("incorrect and unaware"). Among advanced techniques, test scores were lowest for emergency cricothyroidotomy, one of the least frequently practiced and most consequential skills.

The "incorrect and unaware" category is the closest direct analogue of the Dunning-Kruger effect identified in the airway management literature. It identifies precisely the knowledge gaps that self-directed learning will never close, because the clinician does not know they exist.

An international survey of airway education across 61 countries found that confidence was lowest for awake tracheal intubation and front-of-neck access, and that only about one third of respondents reported airway training as a requirement for continuing medical education [20]. Low confidence in rare rescue skills is arguably appropriate. The greater risk lies in high confidence in routine skills that silently fail when the airway turns out to be difficult.

Manifestations in the difficult airway

The bias does not cause a single error type. It amplifies several well-described failure modes, each of which depends on the clinician accurately judging their own progress.

Overconfident Prediction and Planning

Accurate prediction of difficulty is the foundation of airway planning, yet the tools available for it are weak. A Cochrane review of bedside screening tests in apparently normal adults found that commonly used

examinations, including the Mallampati classification and thyromental distance, miss a large proportion of difficult airways. All tests had relatively low sensitivity, and even the best-performing (the upper lip bite test for difficult laryngoscopy) detected only about two-thirds of cases, so no single test was reliable on its own [21]. In a cluster randomized trial of 64,273 patients, introducing a structured multivariable risk score did not reduce the proportion of difficult intubations that were unanticipated [22]. Combined with registry evidence that most difficult intubations are not predicted [5], these data indicate that a clinician's confidence that an airway will be easy carries little information.

Overconfidence at this stage has practical consequences. A clinician who trusts their bedside impression may skip structured evaluation, omit a backup plan, decline an awake technique, or fail to ensure that rescue equipment and skilled help are available. Paradoxically, certainty at the preoperative stage should itself be treated as a warning sign.

Fixation and "One More Attempt"

Fixation errors, the persistent pursuit of a failing plan, are well recognized in airway crises [23]. Although fixation has not been studied specifically as a Dunning-Kruger phenomenon, the same mechanism may help explain why it is hard to self-detect: each additional laryngoscopy feels as though it might succeed, because the clinician lacks the expertise to recognize that technique, not luck, is the limiting factor. The sense that the tube is "almost in" can sustain repeated attempts well beyond the point at which oxygenation should become the sole priority. Repeated attempts cause airway trauma and edema and can convert a "cannot intubate" situation into a "cannot intubate, cannot oxygenate" (CICO) emergency.

Delayed Transition Between Plans

Current guidelines limit laryngoscopy attempts and require an explicit declaration of failure before moving to supraglottic rescue, facemask ventilation, and front-of-neck airway (FONA) [24,25]. The 2015 Difficult Airway Society guidelines emphasized declaring a "failed intubation" and introduced a standardized scalpel-bougie-tube technique for emergency FONA, in part to simplify decision-making under stress [26]. These limits exist precisely because clinicians in the moment overestimate their chance of success. NAP4 identified failure to change routine plans when they failed as a recurrent problem, and 65% of emergency cricothyroidotomies attempted by anesthetists failed to secure the airway [1]. Delay is not only cognitive. Performing an unfamiliar, invasive procedure such as a surgical airway under extreme time pressure is highly stressful, even for experienced clinicians, and an understandable reluctance to "cut the neck" can itself postpone the decision. Acknowledging this fear openly, and rehearsing front-of-neck access until it becomes familiar, may help reduce hesitation.

Failure to Call for Help and the Role of Hierarchy

Calling for help requires the clinician to recognize that they are failing. By extension from the self-assessment literature, the less skilled the operator, the later that recognition may come. Hierarchy compounds the delay. A narrative synthesis of speaking up in the operating room found that team members often hesitate to voice concerns to senior colleagues, citing hierarchy and power differentials, organizational culture, and fear of recrimination [27]. In an airway crisis, the person best placed to recognize failure may therefore be the person least willing to say so, while the person performing the laryngoscopy may be the least able to see it.

Confidence in Unpracticed Rescue Skills

FONA is rarely performed, yet many clinicians believe they could perform it if required. In the Danish study, emergency cricothyroidotomy produced the lowest objective scores among advanced airway techniques [19]. Untested belief in a rescue skill is a dangerous form of overconfidence because it removes the urgency to train.

The Expert Is Not Immune

The original effect concerns novices, but experience creates its own blind spots. Experts may overgeneralize from a career of successful intubations, fail to notice skill decay in rarely used techniques, or believe that algorithms are written for others. The case of Elaine Bromiley, a healthy patient who died in 2005 after a "cannot intubate, cannot oxygenate" event during elective surgery, illustrates this point. The independent review found that experienced clinicians lost track of time while persisting with attempts to secure the airway, and that a surgical airway was not performed although the equipment was available [28]. Because the clinicians involved were experienced, the case does not illustrate the Dunning-Kruger effect in its original sense, which concerns limited competence. Rather, it shows how acute stress, fixation, and loss of situation awareness can temporarily impair even an expert's ability to monitor their own performance, producing a gap between perceived and actual progress similar to that described by Dunning and Kruger. The case has since been widely used in human factors education, largely through the advocacy of her husband [29], and shows that situation awareness, not seniority, protects patients. The relevant question is therefore not "Am I

competent?" but "How would I know if I were not?"

Video Laryngoscopy and Misplaced Reassurance

Video laryngoscopy has substantially improved the safety of tracheal intubation. A Cochrane review found that, compared with direct laryngoscopy, video laryngoscopes of all designs reduced failed intubation (pooled risk ratio 0.44 across 139 trials), and Macintosh-style and channelled devices also reduced hypoxemia, although the improvement in first-attempt success was small [30]. The 2025 Difficult Airway Society guidelines now place video laryngoscopy at the center of Plan A [24].

A better device may, however, generate a new form of overconfidence, although this possibility has not been studied directly. A clear glottic view on the screen may be read as evidence that intubation will succeed, even when tube delivery through a hyperangulated blade proves difficult. Clinicians who rarely use direct laryngoscopy may also overestimate their ability to fall back on it when the video system fails or is obscured by blood and secretions. Conversely, an operator who is skilled with direct laryngoscopy may underestimate the learning curve of a device they use only occasionally. Kelly and Cook emphasized that video laryngoscopes require their own techniques and training, and that their benefits depend on regular use rather than occasional rescue deployment [31].

In each case, the error is the same: a judgment of competence based on the tool or on past success, rather than on objective evidence of performance with that device in that patient. The device reduces risk at the population level, but it does not remove the need for counted attempts, a declared backup plan, and early recognition of failure.

Skill decay and the illusion of retained competence

The Dunning-Kruger effect is usually framed as a problem of people who never acquired a skill. In airway management, a quieter version affects clinicians who once had a skill and have since lost it without noticing. Rescue techniques are performed so rarely that most clinicians' sense of their own ability rests on training received months or years earlier.

The evidence suggests that this sense is optimistic. In a multicenter randomized trial, medical students trained in emergency cricothyroidotomy on a simulator showed significant loss of performance within one month. Only about one in four passed a retention test at one or three months, and none of those tested at six months passed [32]. A meta-analysis comparing simulation-based with non-simulation airway training similarly found that skills declined in both groups by follow-up, with no lasting advantage for either approach [33].

Notably, the decline observed in the cricothyroidotomy trial concerned practical, hands-on technical performance on a simulator, assessed by positioning of the head, palpation of the landmarks, appropriate use of the instruments, and stepwise progression through the procedure, rather than knowledge of the algorithm [32]. At the same time, objective knowledge of cricothyroidotomy was also poor among practicing anesthesiologists [19]. Both the practical and cognitive components of rescue competence are therefore vulnerable, which is why regular hands-on simulation, and not only theoretical teaching, is needed to maintain them.

Skill decay is invisible from the inside. A clinician who performed well on a course remembers the success, not the gradual erosion that followed it. Because the decline is not tested, the memory of competence persists while the competence itself fades. This is analogous to the metacognitive gap described by Dunning and Kruger, although produced by time rather than by inexperience; because skill decay and self-assessment have rarely been measured together, this link remains an extrapolation. It also helps explain why emergency cricothyroidotomy attracted some of the lowest objective scores among practicing anesthesiologists [19], and why only about one third of anesthetists in an international survey reported that airway training was required for continuing medical education [20].

Research on expertise explains why experience alone cannot prevent this. Ericsson argued that expert performance is acquired and maintained through deliberate practice, meaning effortful, focused practice on well-defined tasks with immediate feedback and opportunities for repetition, rather than through accumulated experience as such [34]. Without deliberate practice, performance tends to plateau and may decline even as years of experience increase. Routine clinical work provides abundant experience of easy airways but almost no deliberate practice of rescue techniques.

Mitigation: replacing self-assessment with external structure

Because the Dunning-Kruger effect impairs the very faculty needed to detect it, telling clinicians to "be aware of their limits" is insufficient. Effective countermeasures move the judgment of progress outside the individual's head. Table *2* maps each failure mode to a countermeasure.

Failure mode	Countermeasure	How it bypasses self-assessment
Overconfident prediction	Structured airway assessment and a documented Plan A-D for every patient [24,25]	Assumes difficulty may occur regardless of the clinician's impression
Fixation and repeated attempts	Hard limits on laryngoscopy attempts, mandatory best-attempt optimization [24]	Replaces "one more try" with a counted rule
Delayed plan transition	Cognitive aids such as the Difficult Airway Society algorithm or the Vortex approach [24,35]	Makes the next step visible to the whole team
Failure to call for help	Pre-induction team briefing; any team member may declare a "failed airway"	Distributes situation awareness across the team
Unpracticed rescue skills	Regular simulation of CICO and FONA with structured debriefing	Provides objective feedback on rare skills
Unrecognized knowledge gaps	Objective testing for continuing education, not self-selected learning [19]	Identifies the "incorrect and unaware" domains

TABLE 2: Failure modes in difficult airway management and countermeasures that bypass self-assessment

Source: This table was created by the authors, based on information synthesized from references [19,24,25,35].

CICO: cannot intubate, cannot oxygenate; FONA: front-of-neck airway

Cognitive Aids

Cognitive aids translate guideline recommendations into a form that can be used during a crisis. A review of cognitive aids in anesthesia emergencies found that they improved technical performance in several simulation studies, but not in all, and had mixed effects on teamwork; the authors concluded that careful design, usability testing, and training before an emergency are needed for them to be effective [36]. Their value in the present context is that they externalize the question "what should happen next?", removing it from the impaired judgment of the person performing the procedure. The Vortex approach, for example, uses a single visual template shared by all team members, so that anyone in the room can see when the available non-surgical options have been exhausted [35].

Simulation and Feedback

Simulation is the most direct intervention because it supplies what clinical practice rarely does: repeated exposure to difficulty with immediate, objective feedback. The 2025 Difficult Airway Society guidelines recommend regular, multidisciplinary team-based training that covers decision-making, communication, and human factors as well as device skills, and repeated skills training under stress and time pressure for emergency front-of-neck access [24]. Debriefing matters as much as the scenario, since experience without feedback inflates confidence without improving skill [18].

Simulation is not a cure-all. A meta-analysis found that simulation-based airway training improved observed performance only modestly over other methods, with no clear advantage for patient outcomes or long-term retention [33]. Its value against the Dunning-Kruger effect lies less in the scenario itself than in the objective feedback it makes possible.

Objective Assessment and Recurrent Training

If self-assessment is unreliable and skills decay silently, competence must be measured rather than assumed. Several practical steps follow from the evidence reviewed here. (i) Test knowledge objectively: Adaptive tests that record both the answer and the clinician's confidence can identify "incorrect and unaware" domains that self-directed learning would miss [19]. (ii) Assess performance, not attendance: Rescue skills such as front-of-neck access should be assessed against a structured checklist or rating scale by a trained observer, not recorded as course completion. (iii) Assess non-technical skills: Behavioral marker systems such as Anaesthetists' Non-Technical Skills (ANTS), which rate task management, team working, situation awareness, and decision-making, allow trained observers to assess the very skills that clinicians are least able to judge in themselves [37]. (iv) Retrain on a schedule: Because measurable decay of cricothyroidotomy skill appears within weeks to months [32], recurrent practice should be built into departmental routines rather than left to individual initiative. (v) Close the loop with clinical data:

Departmental audit of first-pass success, number of attempts, and adverse airway events gives clinicians feedback that routine practice otherwise withholds.

The common thread is that each measure replaces "I think I can" with "I was observed to."

Team Culture

Cognitive aids work only if the team is empowered to use them. An anesthesia nurse or technician who notices falling saturation and a third failed laryngoscopy must be able to say "this is a failed intubation" without challenging the anesthesiologist's authority. Structured opportunities to speak up, such as checklists and the pre-induction briefing, a culture of respect led by senior clinicians, and education about speaking up can all lower the barriers identified in the operating room literature [27]. These measures convert a private metacognitive judgment into a shared, observable decision. Joint guidance from the Difficult Airway Society and the Association of Anaesthetists goes further, recommending that departments design workspaces, equipment, and processes so that errors are less likely to occur in the first place, rather than relying on individual vigilance [38].

Intellectual Humility as a Professional Norm

Finally, departments can make uncertainty acceptable. Reporting near misses, discussing personal airway difficulties at morbidity meetings, and openly reviewing performance in simulation all signal that recognizing one's limits is a mark of expertise rather than weakness.

Implications for training and credentialing

The evidence reviewed here has implications beyond individual practice. Training programs have traditionally documented airway competence through case numbers and supervisor sign-off. Case numbers measure exposure rather than performance and largely reflect routine airways. Supervisor impressions, while valuable, can share some of the weaknesses of self-assessment when they are not anchored to structured criteria.

A metacognitively informed approach would differ in several ways. First, it would assess rescue skills directly and repeatedly, rather than assuming that competence demonstrated once persists [32,34]. Second, it would make calibration itself a training objective, for example, by asking trainees to predict their performance before a simulated scenario and then comparing the prediction with an objective rating. Third, it would treat confident but inaccurate self-assessment as a specific learning need rather than a personality trait, consistent with evidence that training in a skill improves the accuracy of self-assessment [7]. Fourth, it would extend these principles to continuing professional development, where airway training is required for only a minority of practitioners [20].

At the level of the individual clinician, Croskerry's model emphasizes that analytical reasoning can be deliberately triggered to override intuitive responses [6]. In airway management, natural decision points already exist: before induction, after each failed attempt, and whenever oxygen saturation falls. Linking a brief, explicit check to each of these moments, such as asking "what is my plan if this attempt fails?", converts metacognitive monitoring from an unreliable internal process into a habit.

Limitations and future directions

This is a narrative review, and its conclusions should be read with several limitations in mind. The literature was selected to illustrate a conceptual argument rather than identified through a systematic search, so relevant studies may have been missed. No formal risk-of-bias or quality assessment of the included studies was performed, and the cited evidence varies considerably in design and quality. Most of the evidence on self-assessment comes from psychology and general medical education, and no study has directly measured the Dunning-Kruger effect in clinicians managing real difficult airways. The magnitude of the effect itself remains contested [9-12], and many of the airway studies cited rely on surveys, simulation, or knowledge tests rather than clinical outcomes.

Future research could address these gaps directly. Useful designs would compare clinicians' predicted and observed performance in standardized airway simulations, test whether confidence-weighted assessment changes subsequent training behavior, and examine whether departments that use objective airway audits and recurrent assessment achieve fewer delayed transitions to rescue techniques. Such studies would move the discussion from a plausible framework to measurable effects on patient safety.

Conclusions

The Dunning-Kruger effect, whatever its exact magnitude, describes a plausible and important hazard in airway management: the clinician least able to manage a difficult airway may also be the least able to recognize that they are failing. It is likely to operate alongside other cognitive biases and may help explain why they go undetected. Experience does not reliably cure it; expertise brings its own blind spots, and new

technology and the silent decay of rarely used skills add further ways for confidence to drift away from competence.

The lesson for anesthesiology is not that clinicians should distrust themselves, which is neither practical nor helpful in an emergency. It is that airway safety should not depend on accurate self-assessment at all. Structured planning, counted attempts, cognitive aids, empowered teams, objective assessment, and deliberate practice with feedback each replace an unreliable internal judgment with an external one. In the difficult airway, the safest clinician is not the most confident one but the one who has built systems that do not require them to be right about themselves.

Additional Information

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All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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