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REVIEW



Optical and video stylets for airway management: an expert review

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ABSTRACT

Introduction: Optical and video stylets are increasingly important airway management devices that combine real-time visualization with a slim rigid or semi-rigid design. They facilitate tracheal intubation in anatomically constrained airways while minimizing cervical spine movement and mouth-opening requirements.

Areas covered: This narrative review examines the evolution, technical principles, classification, clinical applications, safety profile, and future developments of optical and video stylets. A structured literature search of PubMed/MEDLINE, Embase, and the Cochrane Library was conducted for publications published between January 1990 and January 2026. Randomized controlled trials, observational studies, systematic reviews, meta-analyses, and relevant international guidelines were prioritized.

Expert opinion: Video stylets have progressively replaced optical systems because of superior image quality, ergonomics, and training utility. Their greatest value lies in anatomically constrained airways and as complementary tools within multimodal airway management strategies. Persistent limitations, particularly lack of suction capability and sensitivity to contamination, support their role as adjuncts rather than universal airway devices.

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1. Introduction

Airway management is a core component of anaesthetic practice, emergency medicine, and critical care [1–4]. Although direct laryngoscopy has long been the standard technique for tracheal intubation, its effectiveness may be limited in patients with anatomical variation, restricted mouth opening, cervical spine immobility, or other predictors of a difficult airway [5,6]. These limitations have driven the development and adoption of alternative airway devices designed to improve visualization and increase intubation success while minimizing physiological and mechanical stress [7].

Optical and video stylets represent a distinct category within this evolving landscape. By combining the guiding function of a stylet with integrated visualization—either fiberoptic or digital—they allow operators to advance the endotracheal tube under direct vision without requiring alignment of the airway axes [8]. Their slim profile allows intubation even when oral access is limited. This becomes particularly relevant in difficult airway scenarios [9]. They may also be effectively integrated into hybrid intubation techniques, in which videolaryngoscopy is used for initial anatomical orientation—such as identifying the epiglottis or tongue base—followed by video stylet-guided advancement to achieve precise positioning at the laryngeal inlet. This hybrid

approach highlights their role not only as standalone devices but also as complementary tools that enhance visualization and facilitate tube delivery when used alongside videolaryngoscopy.

Despite their increasing availability, the clinical role of optical and video stylets continues to evolve [10,11]. Their use spans a wide range of devices, patient populations, and clinical settings, and their relative position alongside videolaryngoscopes, flexible bronchoscopes, and supraglottic airway-guided techniques remains context dependent [12]. A clear understanding of their design principles, performance characteristics, and limitations is therefore essential to support appropriate device selection and integration into modern airway management strategies. For this narrative review, a structured literature search was conducted in PubMed/MEDLINE, Embase, and the Cochrane Library covering publications from 1990 to January 2026. Search terms included combinations of ‘optical stylet,’ ‘video stylet,’ ‘intubating stylet,’ and ‘airway management.’ Randomized trials, comparative studies, systematic reviews, and relevant international guidelines were prioritized. Reference lists of key publications were manually screened to identify additional relevant studies. In clinical practice, device selection is rarely binary and often reflects nuanced trade-offs between anatomy, operator experience, and procedural urgency.