

An audit of laryngoscopes and application of a new ISO standard

The International Organization for Standardization (ISO) has established a standard (ISO 7376:2009) for laryngoscope light

In this single-center audit of 18 reusable laryngoscopes, 17 laryngoscopes (94%) did not meet the ISO standard (500 lux after 10 minutes) for mean illuminance

Objective

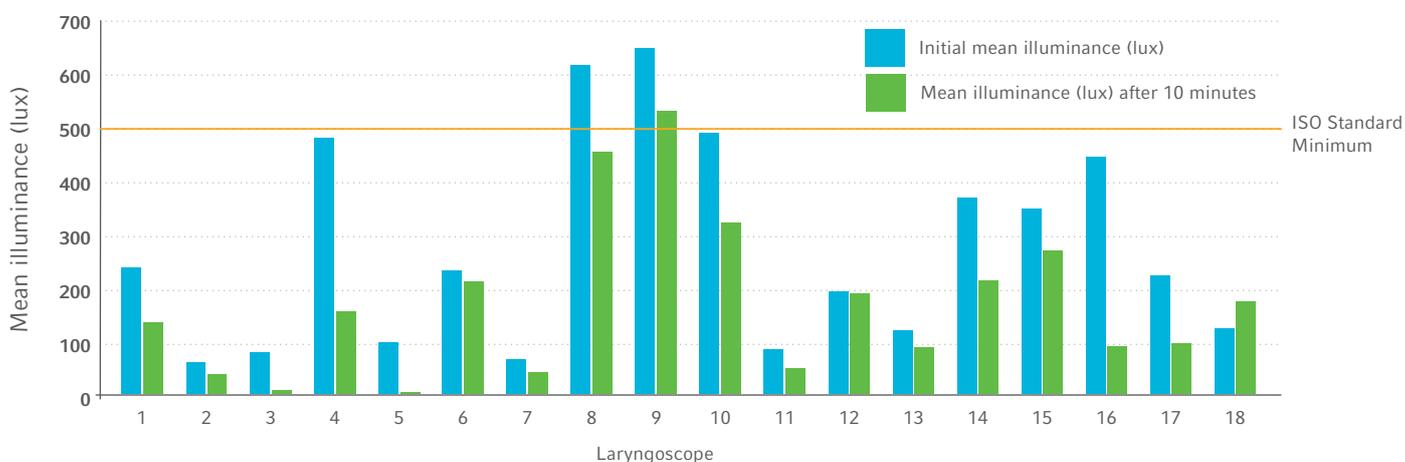
- To measure the light intensity from laryngoscopes available for use by anesthesiologists in a single anesthetic department, and to compare them to the ISO illuminance standard and published minimum acceptable luminance limits

Methods

- A prototype measuring device was developed to control ambient and scattered light and to position each laryngoscope in a standardized manner
- Illuminance was measured using a lux meter at the base of this device

- An initial pilot study was conducted of 190 reusable laryngoscopes collated from 6 operating rooms and 10 off-the-floor sites at a single medical center
 - The sample consisted of 43 laryngoscope handles and 192 laryngoscope blades, of which 133 were 'bulb-in-handle' blades and 57 were 'bulb-in-blade' blades
 - Two blades were incompatible with the available handles and were excluded from the study
 - Depending on compatibility, each handle was used for four or five different blades
- Following the pilot study, a 'snapshot audit' was undertaken in which eighteen clinically available laryngoscopes (three devices from each workstation of six operating rooms) were evaluated in greater detail using the ISO 7376:2009 standard
 - The audit provided a 'snapshot' of equipment available on a particular day
 - Lux measurements were taken before and after a 10-minute interval during which the laryngoscopes remained switched on
 - This was repeated three times for each laryngoscope and mean values were calculated
 - Luminance provided by each laryngoscope was also measured

Figure 1. Illuminance recordings for 18 laryngoscopes



Results

- In the pilot study of 190 laryngoscopes, the reported range of illuminance was 0–4789 lux (median 345 lux; interquartile range [IQR] 170–605 lux)
- In the audit of 18 laryngoscopes, initial median illuminance was 228 lux (IQR 101–447) reducing to a median of 148 lux (IQR 9–218) after 10 minutes
- Of the 18 laryngoscopes evaluated, only one, with a mean illuminance of 534 lux at 10 minutes, met the ISO standard minimum of 500 lux after 10 minutes (Figure 1)
- Only half of the laryngoscopes (9/18) tested achieved a mean luminance of 100 cd.m⁻² (median 92 cd.m⁻² [IQR 44–177]) – the reported minimum required luminance for laryngoscopy

Conclusions

- In this single-center “snapshot” audit of 18 reusable laryngoscopes, laryngoscope light characteristics were substandard compared with ISO 7376:2009¹ and most did not achieve a minimum acceptable luminance level

¹ International Organization for Standardization. ISO 7376:2009: anaesthetic and respiratory equipment – laryngoscopes for tracheal intubation. Available from: <https://www.iso.org/standard/44073.html> Accessed: 23 July 2018