Section: Anaesthesiology

Original Research Article

COMPARING EASE OF INTUBATION IN SNIFFING AND NEUTRAL POSITION USING CHANNELLED AND NON-CHANNELLED VIDEOLARYNGOSCOPES DURING ELECTIVE SURGERY- A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: Head and neck position influences intubation success. Although the sniffing position is traditionally used, video laryngoscopy reduces reliance on airway-axis alignment, making the neutral position clinically relevant. Evidence comparing both positions with channelled and non-channelled videolaryngoscopes remains limited. This study aimed to compare ease of intubation, laryngoscopy time, and intubation time between the neutral and sniffing positions in elective surgical patients. **Materials and Methods:** This prospective randomised controlled trial included 140 adults undergoing elective surgery under general anaesthesia at Government Tiruvannamalai Medical College and Hospital, Tamil Nadu (April 2023–April 2024). Patients were allocated to neutral or sniffing head positions and intubated using channelled or non-channelled videolaryngoscopes. Adults with normal airway assessment (Mallampati I–II, adequate mouth opening, normal neck mobility) were included; those with difficult airway predictors, cervical spine disease, obesity, infection, aspiration risk, or prior airway surgery were excluded. Intubation difficulty, procedural times, success rates, and additional manoeuvres were recorded. Group comparisons used t-tests, chi-square tests, or Fisher's exact tests as appropriate. **Result:** Baseline demographics were comparable between groups. The neutral position demonstrated lower modified Intubation Difficulty Scale scores (0.52 ± 0.6 vs 1.32 ± 1.3; p = 0.05). Intubation time was significantly shorter in the neutral position (mean difference 14.7 s, 95% CI 12.8–16.5; p = 0.05), as was laryngoscopy time (8.7 ± 1.8 vs 10.6 ± 2.5 s; p = 0.05). First-attempt success was higher in the neutral group (84.3% vs 70%; p = 0.04). Fewer patients required alternate techniques (8.6% vs 30%; p = 0.01) or external laryngeal pressure (2.9% vs 17.1%; p = 0.02). **Conclusion:** The neutral head position provides easier, faster, and more successful videolaryngoscopic intubation than the sniffing position in elective surgical patients. It may serve as a practical alternative and could be beneficial when reducing cervical movement is desirable.

INTRODUCTION

Airway management is a core skill for anaesthesiologists and all providers involved in resuscitation and acute care. It remains a major focus of research and innovation aimed at improving efficiency and patient safety.[1] Endotracheal intubation is widely regarded as the gold standard in airway management, highlighting the importance of effective airway care in patient treatment.[2] An optimal glottic view is essential for successful endotracheal intubation and depends on proper head and neck positioning during direct laryngoscopy.[3]

The sniffing position better aligns the oral, pharyngeal, and laryngeal axes than simple head extension, providing a clearer laryngoscopic view and improving conditions for intubation.[4] The sniffing position raises the head and extends the neck, long considered optimal for direct laryngoscopy. However, studies show it does not truly align the oral, pharyngeal, and laryngeal axes. Simple extension and

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hyperextension offer alternative head–neck positions without elevating the head.[4,5] Cervical spine injury often require airway support, and although neurological deterioration is a concern, the true risk remains uncertain. Because of varied clinical features, no single airway approach suits all cases.[6] Head-elevated positioning, which aligns the external auditory meatus with the sternal notch, improves laryngeal visualisation compared with lying flat and gives a better glottic view with fewer optimisation manoeuvres in simulated difficult airways.[7] It also enhances glottic visibility during video laryngoscopy more than the traditional sniffing position, likely because visualisation relies on an indirect camera view rather than alignment of airway axes.[8]

Studies comparing sniffing and neutral positions with channelled and non-channelled videolaryngoscopes reported no major difference in intubation ease, supporting the usefulness of the neutral position when cervical motion must be limited.[9] Channelled blades guide the tube without a stylet and may lower airway injury; in simulated cervical immobilisation, intubation success was similar between blade types, but channelled designs caused fewer subglottic injuries.[10] Overall, evidence on neutral versus sniffing positions in videolaryngoscopy remains inconsistent, and few studies evaluate both positions across different blade designs. A clear comparison in elective surgical patients is lacking. Therefore, this study compares ease of intubation, laryngoscopic time, and intubation time in neutral versus sniffing positions using both channelled and non-channelled videolaryngoscopes in elective surgical patients.

MATERIALS AND METHODS

This prospective randomised controlled trial was conducted on 140 adult surgical patients in the Department of Anaesthesia at Government Tiruvannamalai Medical College and Hospital, Tamil Nadu, from April 2023 to April 2024. The Institutional Ethics Committee of Government Tiruvannamalai Medical College approved the study, and written informed consent was obtained from all participants before enrollment.

Inclusion criteria

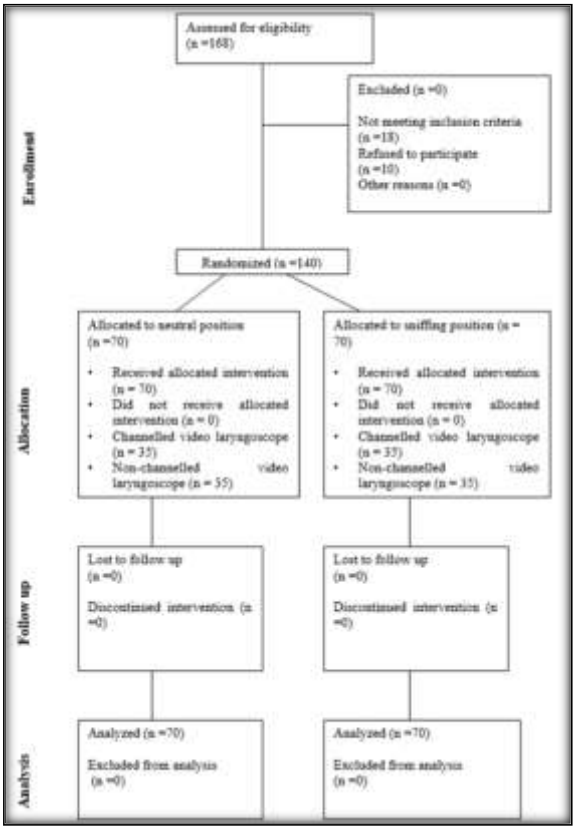
Patients aged 18–60 years scheduled for elective surgery requiring general anaesthesia with endotracheal intubation, ASA physical status I or II, normal airway assessment with Mallampati Class I–II, adequate mouth opening, normal neck mobility, and provided written informed consent were included.

Exclusion criteria

Difficult airway, including Mallampati Class III or IV, limited mouth opening, or restricted neck movement, cervical spine disease, morbid obesity (BMI >30), upper respiratory infection, or aspiration risk such as full stomach, reflux, or pregnancy, previous airway surgery, congenital airway abnormalities, significant cardiopulmonary disease, or lack of informed consent were excluded.

Methods: Patients were assigned by randomisation into two groups of 70. A computer-generated sequence with block randomisation (block size 4) ensured equal allocation, and group assignments were concealed in sequentially numbered, opaque, sealed envelopes prepared by an independent researcher. One group was kept in a neutral position, with the head aligned without flexion or extension; the other was placed in the sniffing position with neck flexion and head extension. Each group was divided again so that half underwent intubation with a channelled videolaryngoscope and the other half with a non-channelled device, giving equal distribution of blade types across positions.

Data collected included the modified Intubation Difficulty Scale score, laryngoscopy time, intubation time, number of attempts, first-attempt success rate, percentage of glottic opening (POGO) score, need for additional manoeuvres such as external laryngeal pressure, and any complications. Data was collected prospectively using structured case-report forms. Intubations were done by experienced anaesthesiologists following a standardised anaesthesia protocol. The assigned head position was maintained throughout, and successful intubation was confirmed with capnography and bilateral chest auscultation. Intubator blinding was not feasible, but laryngoscopy time, intubation time, POGO score, and IDS score were recorded by an independent observer who remained blinded to group allocation.



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Statistical Analysis: Data were analysed using IBM SPSS Statistics v27. Continuous variables were presented as mean and standard deviation and compared using Student's t-test or ANOVA. Categorical variables were expressed as percentages and compared using chi-square or Fisher's exact tests. A p-value <0.05 was considered statistically significant.

RESULTS

A similar mean age (36.1 ± 9.5 vs 35.3 ± 9.5; p=0.89), female proportion (42.9% vs 42.9; p=1.00), BMI (22.8 ± 1.2 vs 23.2 ± 1.6; p=0.14), mouth opening (4.36 ± 0.3 vs 4.37 ± 0.2 cm; p=0.86), ASA I status (81.1% vs 66.7%; p=0.08), and Mallampati I classification (56.5% vs 57.9%; p=1.00) were comparable between groups [Table 1].

The neutral position showed lower IDS scores (0.52 ± 0.6 vs 1.32 ± 1.3; p=0.05), shorter intubation (25.2 ± 4.9 vs 39.9 ± 6.3 s; p=0.05) and laryngoscopy times (8.7 ± 1.8 vs 10.6 ± 2.5 s; p=0.05), higher first-attempt success (84.3% vs 70%; p=0.04), and reduced need for alternate techniques (8.6% vs 30%; p=0.01) and external laryngeal pressure (2.9% vs 17.1%; p=0.02) [Table 2].

Table 1: Baseline demographics and airway scores

Variable	Neutral position	Sniffing position	P value
Mean age (years)	36.1 ± 9.5	35.3 ± 9.5	0.89
Female (%)	42.9	42.9	1
Mean BMI	22.8 ± 1.2	23.2 ± 1.6	0.14
Mouth opening (cm)	4.36 ± 0.3	4.37 ± 0.2	0.86
ASA 1 (%)	81.1	66.7	0.08
Mallampati 1 (%)	56.5	57.9	1

Table 2: Intubation outcomes between groups

Outcomes	Neutral position	Sniffing position	P value
Modified IDS score	0.52 ± 0.6	1.32 ± 1.3	0.05
Intubation time (seconds)	25.2 ± 4.9	39.9 ± 6.3	0.05
Laryngoscopic time (seconds)	8.7 ± 1.8	10.6 ± 2.5	0.05
First attempt success(%)	84.3	70	0.04
Alternate technique used (%)	8.6	30	0.01
External laryngeal pressure (%)	2.9	17.1	0.02

DISCUSSION

This study compared neutral and sniffing head positions during videolaryngoscopic intubation using both channelled and non-channelled devices. The neutral position showed easier intubation, lower IDS scores, faster laryngoscopy and intubation times, higher first-attempt success, and fewer required manoeuvres, indicating a more efficient and reliable approach for elective surgical intubation. These findings related to that video laryngoscopy relies on camera orientation rather than alignment of airway axes, allowing the neutral position to provide an equally favourable or improved glottic view.

Both groups had similar, including age, sex, BMI, mouth opening, ASA status, and Mallampati classification. Similarly, Mendonca et al. found that similar across groups, ages ranged 49.6–51.7 years, male–female ratios 29:20 to 24:25, BMI 26.8–27.8 kg/m², mouth opening 4.1–4.3 cm, thyromental distance 7.1–7.7 cm, Mallampati classes predominantly I–II, and ASA scores mainly I–II.[11] Bhardwaj et al. found that mean age was comparable (38.4 ± 11.34 vs 38.1 ± 15.23), as were height (166.08 ± 8.84 cm vs 167.05 ± 8.61 cm), weight (67.27 ± 12.62 kg vs 62.93 ± 11.04 kg), and BMI (24.31 ± 3.68 vs 22.58 ± 3.61). ASA I/II distribution (20/10 vs 15/15), Mallampati grades (6/17/7 vs 4/17/9), thyromental distance (<6 cm: 66.7% vs 76.7%), and mouth opening (>3 cm: 100% vs 90%) were also comparable.[12] Therefore, in both studies, the demographic variables were comparable between groups; future studies should involve larger and more diverse populations to strengthen these findings.

The neutral position made intubation easier, with lower IDS scores, shorter times, higher first-attempt success, and fewer required manoeuvres than the sniffing position. Similarly, Kang et al. found that intubation was easier in the neutral position, with fewer difficult intubations (27.9% vs 63.6%; p=0.001) and a higher first-attempt tube advancement rate (95.3% vs 61.4%; p<0.001) associated with the sniffing position. This consistent with our results and support the possibility that the neutral position may facilitate smoother tube advancement during videolaryngoscopy.[13] Lee et al. found that intubation was significantly faster in the ramped position, with total intubation time 22.5 ± 6.2 s compared with 40.9 ± 9.0 s in the sniffing position (p < 0.001). Laryngoscopy time was also shorter (10.0 ± 2.7 s vs 18.9 ± 4.5 s; p < 0.001). This study was conducted in morbidly obese patients and compared the ramped and sniffing positions using a video laryngoscope.[14] This similarity suggests that reduced dependence on airway-axis alignment may explain why the neutral position performed well in our study.

Alam et al. found that airway manoeuvres were required less often in the 25° back-up position than in the flat position with both King Vision (32% vs 68%) and McGrath scopes (28% vs 60%), with a risk ratio of 0.48 (p < 0.001). Intubation was also faster in the

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25° position, and all patients were intubated on the first attempt, indicating that back-up positioning reduced manoeuvre use and improved intubation speed and success.[15] This align with our results and support the view that alternative head positions can enhance glottic visualisation and limit the need for ancillary adjustments during video laryngoscopy. Further studies should assess whether these advantages persist in difficult airway and emergency settings.

The randomised design, use of standardised procedures, and independent outcome assessment strengthen the reliability of our findings. Our results show that the neutral position is a practical option for routine videolaryngoscopic intubation and may be safer when cervical movement should be restricted. Including the neutral position into routine practice may simplify the intubation process and reduce the need for additional manoeuvres in patients with normal airways.

Limitations: This study is limited by its single-centre setting, the modest sample size, and the inclusion of only elective cases with normal airways. Detailed comparisons between channelled and non-channelled videolaryngoscopes were not examined beyond primary outcomes, which restricts interpretation of device-specific differences.

CONCLUSION

The neutral head position enabled easier and more efficient videolaryngoscopic intubation than the sniffing position in elective surgical patients. It reduced intubation difficulty, shortened laryngoscopy and intubation times, improved first-attempt success, and required fewer optimisation manoeuvres. This show that the neutral position is a practical option with both channelled and non-channelled videolaryngoscopes. Its simplicity and minimal cervical movement make it attractive for routine practice, though evidence in patients with limited neck mobility is still lacking. Larger multi-centre studies that include difficult airway and emergency cases, and that compare videolaryngoscope designs, are needed to identify the most effective head position across diverse clinical settings.

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