Is there an optimal place to hold the endotracheal tube during direct laryngoscopy? Protocol for a Randomised Controlled Trial

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Research Article

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Abstract

Background: Laryngoscopic endotracheal intubation (LEI) is a widely performed lifesaving technique. There are evidence and guidelines to help decide the optimal sized endotracheal tube (ET), laryngoscope, depth of insertion, and patient position for successful endotracheal intubation. We hypothesize that after glottic visualization, the point at which the ET is held will affect the time, ease, and success of the technique due to a difference in visualization and torque. We aim to compare two sites of holding the ET after optimal laryngeal-inlet visualization: time to intubation, rate of success of first pass intubation, intubation difficulty and complications.

Methods: Supervised intubations on ASA 1-2 patients (>18 years) posted for surgery under general anesthesia performed by anesthesia trainees (experience <18 months) will be included. Patients with an anticipated difficult airway or unanticipated difficulty - CL grade > three or requiring the use of airway adjuncts will be excluded. A computer-generated numbers list will randomize patients; allocation concealed with opaque sealed envelopes. ET marked at the selected site will be handed to the intubator by the theatre-technician once she/he confirms the optimum laryngoscopic view. The entire procedure will be video recorded. Two blinded assessors will independently review the videos to document the time to intubation (TTI defined as the time from holding the ET to the removal of laryngoscope from the mouth after successful intubation) and intubation difficulty score. Postoperative sore throat and hoarseness will be recorded.

Sample size: 54 experienced anesthetists were video-recorded during intubating. The site of holding ET and TTI were analyzed. The mean site was 3 SD 2.5 cm from the tip, yielding two sites for the study- 19 cm (Gr 1) and 24 cm (Gr 2). To detect a 20% difference in intubation time between groups, the confidence of 95%, and power 85%, we will need **298** patients: 180 per group after accounting for data loss.

Discussion: This will be the first study to assess whether holding the tube at a particular site has any impact on the ease and time taken for intubation. This study's findings will provide the first scientific evidence for an appropriate place for holding the ET during LEI, which we feel will help trainees improve their LEI technique.

Trial registration: CTRI/2019/09/021201, Clinical Trials Registry India. <http://ctri.nic.in/Clinicaltrials/advsearch.php>. Registered 12th September 2019,

Introduction

Background and rationale {6a}

Laryngoscopic Endotracheal Intubation (LEI) is a fundamental procedure for securing the airway, performed for resuscitation in emergency scenarios or elective conditions such as general anesthesia. Successfully placing the endotracheal tube (ET) in the trachea is a skill learned over time. Successful intubation by anesthesiology trainees has been defined by Konrad et al.¹¹ as "adequate technical

performance" without any staff assistance. Traditional teaching guides the trainees on the optimal position of patients' head and neck, the size of the endotracheal tube, type of laryngoscope, method of laryngoscopy and direction of bevel for intubation success. ²

This study's senior investigator has more than 20 years of experience as a teacher of graduate and post-graduate trainees (medical and paramedical) in emergency medicine, anesthesia and critical care. Over years of witnessing thousands of laryngoscopic intubations, she observed that more experienced personnel hold the ET farther away from the patient-end than do trainees. Discussions among peers confirmed that others shared her opinion. The consensus was that by learning from the experience of multiple intubations, experienced personnel realized (subconsciously) that the further the tube is held from the tip,

- Better is the resultant glottic view – the right hand gripping the tube has a lesser chance of coming in the field of vision during the wrist movements.
- Easier it is to fine-adjust the movement of the tip of the ET close to the glottis. As the pivot (point of rotation of the tube, usually the thumb) moves away from the tip, the negative torque exerted by the distal part of the ET decreases, thereby making it easier to manipulate and guide it into the glottic opening. Figure 1
- With inexperienced trainees, juggling between maintaining the forces and torque on the laryngoscope with the left hand and coordinating the right-handed movements might make the process more difficult.

A literature search resulted in only one mannikin-based study: it hypothesized that the position of holding the tube would logically affect the path of vision and torque applied to the ET during the procedure. The farther the tube is held, with the elbow close to the chest, the greater the positive torque will be generated when the cuff passes the incisors, affecting the ET tip's tilting angle. ³

There is no data available in human studies. Experts hold the ET at an optimal position by virtue of their experience. However, without evidence and guidelines for the optimal position, trainees tend to hold it over a range of places.

We postulate that given good visualization of the glottis (best laryngoscopic vision), the place where the ET is held will affect the time for intubation, complications, and the success of LEI performed by trainees.

Objectives {7}

Aims: To find if the place where the ET is held (site) affects LEI after a good laryngoscopic view is attained.

1. *Objectives:*

Primary Objective- To compare the Time to Intubation (TTI) between two groups of trainees holding the ET at two different (predetermined) sites.

Secondary Objectives- To compare between the groups

- Rate of success of first-pass intubation
- Intubation Difficulty Score (IDS)
- The subjective ease of intubation as assessed by the trainee, the supervising anesthetist and a blinded assessor.
- Airway-related complications.

Trial design {8}

This will be a single-center, parallel-group, double-blind, randomized equivalence trial in a 1:1 allocation ratio

Methods: Participants, Interventions, And Outcomes

Study setting {9}:

This study will be conducted at the Department of Anesthesiology and Critical Care at All India Institute of Medical Sciences, Bhubaneswar, Odisha, India. AIIMS Bhubaneswar is a 900-bed tertiary care academic hospital, a designated center of national importance. It runs graduate and post-graduate training courses for a large number of medical and surgical specializations. The study is planned in the main operation theatre complex with 25 operation theatres spread over four floors. Annually more than 12000 surgeries take place under general anesthesia.

Eligibility criteria {10}: The participants included in the study will be

- i. Patient: Adult patients (Age > 18 years) with ASA I to II functional status undergoing elective/emergency surgical procedures under general anesthesia can understand and provide valid consent for the procedure. The exclusion criteria will be patients less than 18 years of age, American Society of Anesthesiologists (ASA) > 2 functional status, patients having Cormack Lehane (CL) grading more than 2 on direct laryngoscopy, and refusal to give consent for the study.
- ii. Intubator- Intervention (intubation) will be performed by trainee anesthesia residents who have less than eighteen months of experience. As a part of the curriculum, training in the theory of airway management and mannikin intubations will ensure that all the trainees have experience of a minimum of 40 intubations on mannikins or patients. A consultant anesthetist will supervise all intubations per protocol.

- iii. Procedure- All procedures will be video recorded from the time patient is positioned after induction, and the laryngoscope is asked for, to after confirmation of correct tube position (this may be visual, auscultatory, or by EtCO₂ guided)

Procedures where the trainee deviates from the methodology- improper table position, CL grade to be > 2, use of a bougie, stellate or other airway adjuncts, or take-over by the consultant (unanticipated difficult airway), will be video recorded but excluded from the analysis. This will reduce confounding the time to intubation due to poor visualization of the laryngeal inlet.

A few cases were tried with a Go-Pro camera, hoping that we would also get data for the exact laryngoscopy view, but this approach was abandoned as the visual axis of the camera was never identical to the LEI, and the forehead mounted camera made the process more cumbersome for the trainee.

Who will take informed consent? {26a}

The investigators will identify eligible participants based upon inclusion and exclusion criteria. A detailed written and oral information on the study will be provided to the patients in an understandable language (English/Odia), and the investigators will take written informed consent.

Additional consent provisions for collection and use of participant data and biological specimens {26b}

The written consent will include information regarding videography of the procedure of intubation and use of relevant data for academic purposes.

Interventions

Explanation for the choice of comparators {6b}

An explanation for the selection of intubator- It was hypothesized that we would need to include trainees who had a good knowledge of and experience for proper laryngoscopy, so that poor vision of the glottis would not confound the time to intubation. We did not want to include personnel who were very experienced as various other subtle 'learned/ subconscious' maneuvers would be difficult to predict or control for in them. As per previous studies, 40–60 LEIs on patients or manikins were considered adequate.^{1,4}

An explanation for the site of holding the ET- The two sites of holding the ET were selected, based on a pilot study involving video recording the procedure of intubation by 54 experienced (> 3 years) anesthesiologists. The mean site of holding the tube was 21.3 cm with a standard deviation (SD) of 2.5 cm. Hence two groups' extremes from the mean $\pm$ 1 SD were chosen and rounded upto the nearest number, one at 19 cm (GROUP 1) and the other at 24 cm (GROUP 2).

Intervention description {11a}

Equipment- All emergency airway and resuscitation equipment will be available. ETCO₂ enabled anesthesia machines, and SpO₂ probes will be in place.

Personnel-

1. The consultant anesthetist and trainee will position the patient and prepare for intubation.
2. Operation theatre technician (not a part of the research team) will select a sealed envelope after the patient enters the theatre and the WHO checklist is completed. He will then mark the endotracheal tube at the site the patient has been randomized to- 19 or 24 cm with a transparent sticker.
3. A trainee technician (not a part of the research team) will be positioned in a way such that the entire process is visible and will video record the procedure

Position- The head position will be optimized to get the best possible view of the vocal cords. The "sniffing position" that aligns the oral, pharyngeal and laryngeal axes will be achieved by elevating the patient's head, extending the head at the neck, and aligning the ears horizontally with the sternal notch. In morbidly obese patients, rolls will be utilized. ²

The operating table's position will be at the height of the intubators xiphoid process and her/ his eyes about 1 foot (~30 cm) above the patient's face to provide proper angles and distances for laryngoscopy.⁵ If the table position is not 'exact' (in the videography), but the intubator has declared a CL grade 1 or 2 view, the procedure will be considered adequate as the head and neck position has been considered less critical for a successful LEI.⁴

Laryngoscope- All procedures will be performed with a curved blade Macintosh laryngoscope, size $\frac{3}{4}$ as appropriate for the patient.

Endotracheal tube- All patients will be intubated with new, single-use, room temperature, PVC, high volume, low pressure, cuffed ET of appropriate size. All tubes are procured from the same company at the institute. Use of a stylet or bougie will not be allowed in the first attempt.

Medications- All the patients in both groups will undergo a standard anesthesia technique using Fentanyl 2 mcg per kg for analgesia, 2.5 mg per kg of propofol for induction, and 0.07–0.1 mg/kg of vecuronium for muscle relaxation. Maintenance of anesthesia will be with isoflurane or sevoflurane, aiming for an agent appropriate MAC intubation.

Technique-

After induction and a minimum of 3 minutes of administering the paralytic agent, the intubator will perform the laryngoscopy.

Once the intubator declares that the CL grade is optimal (CL < 3)-it will be confirmed by the faculty or senior either verbally or visually.

Once declared as an 'optimum laryngoscopic view,' the tube will be handed over by the technician to the intubator-instruction will be given to take the first attempt at the marked point, with the elbow close to the body, with the thumb at the plastic marker, index, and middle fingers opposite. [2]. If the above proves difficult-any change in methodology is allowed as per faculty decision and documented from the video.

The whole procedure will be videographed.

Post Procedure- Post extubation, the airway will be checked for any complications like bleeding or sore throat in the immediate postoperative period. If there is an event of failed intubation by the trainee, then the senior will be assessed during the process of intubation.

Criteria for discontinuing or modifying allocated interventions {11b}

If the intubator cannot intubate at the given tube mark, he will be allowed to change the site of grip – the site change will be noted from the video. If he/ she still fails, the consultant can take over.

Strategies to improve adherence to interventions {11c}

All residents and faculty will be informed about the study protocol for improving adherence. The intubator will be instructed about the procedure, and a transparent film shall be marked on the tube to guide the intubator on the site of holding.

Relevant concomitant care permitted or prohibited during the trial {11d}

For the study, no standard treatment shall be withheld. No differential treatment or partiality in any form will be extended to a patient who has refused to be a part of the study or who voluntarily withdraws from the study at any point.

Provisions for post-trial care {30}

In the improbable event of any untoward events arising from the intervention, the researchers will treat them within the available institutional facilities' bounds.

Outcomes {12}

Primary outcome measures: 1) Time to intubation (TTI) in both the groups.

The TTI will be calculated from holding the ET to removing the laryngoscope- after declaring a tube passed 'under vision.'The frame has been chosen to reduce bias due to laryngoscopy problems or delay due to attaching the circuits and ventilating till capnographic confirmation of correct tube position.

Secondary outcome measures assessed will be first-pass intubation success rate, intubation difficulty scores (IDS)⁶, ease of the intubation assessed by intubator, faculty, and a blinded assessor unrelated to

the study on Likert scale (0 – very easy to 5 -extremely difficult), and incidence of complications (bleeding or sore throat) in each group.

The intubation difficulty score (IDS) comprises of attempt (in no), additional operators (if any then in no), Alternative technique: stylet/bougie, Cormack Lehane grading (CL Grade: I/II/III/IV), Lifting Force: Normal (0)/Increased (1), External Laryngeal pressure required during insertion of the tube: No (0) / Yes(1), Position of Vocal cords: Abducted(0)/Adducted(1).

Assessments from the video footage- These assessments will be done by two different anesthesiologists independently. The mean values will be used for analysis after disputes/ disagreements (if any) are settled by a third person not belonging to the research team. This will reduce bias due to possible errors in time calculations.

Participant timeline {13}

Study period					
	Enrolment allocation	Post allocation			
Timelines	Before surgery	Before intubation(induction to mask ventilation)	Intubation	Post intubation	Post extubation
ENROLLMENT					
Informed consent	X				
Eligibility criteria	X				
Allocation	X				
INTERVENTIONS					
GROUP 1 (19 CM)		<————— —————	—————	—————	—————>
GROUP 2 (24 CM)		<————— —————	—————	—————	—————>
ASSESSMENTS					
Demographic characteristics	X				
Airway assessment	X	X			
Experience of intubator (in months)		X			
Time of holding of ET (T1)			X		
Time of removal of laryngoscope(T2)				X	
Time to intubation (from T1 to T2)			X	X	
Intubation difficulty score			X		
Any change in the site of holding the tube			X		
Videography during intubation		X	X	X	
Ease of intubation on Likert scale by intubator			X	X	

Study period		
Ease of intubation assessed by faculty	X	X
Ease of intubation assessed by a blinded assessor		X
Incidence of airway trauma (bleeding/ sore throat)	X	X

Sample size {14}

Based on the pilot study, the mean time to intubation was found to be 8.83 seconds, a standard deviation of 4.07 seconds, and variance of 16.57 seconds.

Using this information – an allocation ratio of 1:1, to ascertain a 20% difference in time to intubation between the two groups, it was calculated that a sample size of at least 149 participants in each group is necessary to detect a difference of 1 second in time to intubation in between the groups, if we allow a confidence level of 95% and power our study at 85%. Thus a total sample size to demonstrate the minimum effect size is 298, and assuming approximately 20% loss and rounding upto the nearest number, the total sample size required is 360(180 in each group). The calculation was done using online sample size calculators <http://powerandsamplesize.com> and <http://www.sample-size.net> using comparison of means for two-sided equality and the normal approximation using the Z statistics instead of the T statistics. The calculated sample size was concordant between the two calculators used.

We felt a 20% difference in Time to intubate (TTI) as defined by us in the study would be clinically significant- as this difference means greater manipulations after the tube is inside the oral cavity- resulting in more significant trauma and complications of intubation.

Recruitment {15}

The patients posted for surgery under general anesthesia will be assessed for eligibility criteria from the preoperative period. It is estimated that with the volume of surgeries and new trainees the institute sees every year, the sample size will be easy to achieve.

Assignment Of Interventions: Allocation

Sequence generation {16a}

The enrolled participants will be randomized to one of two groups. A web-based random number generator (randomizer.org) will be used for the simple randomization scheme. Participants will be randomized to either of the two groups at a 1:1 allocation ratio.

Concealment mechanism {16b}

Once a patient has been enrolled, the operating room's technical staff will open an opaque sealed envelope containing the group allocation.

Implementation {16c}

Neither front-line care providers, investigators, or participants will be aware of whether the next eligible participant will be receiving treatment or control intervention. One of the team members will enroll the participants and leave the set of sequentially numbered sealed opaque envelopes with the OT technician (OTT) responsible for anesthesia for the patient. The OTT will not be a part of the research team and will open the sealed envelopes to read the randomization sequence, which will be matched with the random number sequence generated earlier.

Assignment Of Interventions: Blinding

Who will be blinded {17a}

The patient, the outcome assessor, and the data analyst will be blinded to the study intervention. The intraoperative anesthesia team will not be blinded to the study.

Procedure for unblinding if needed {17b}

In infrequent circumstances which may hamper the patient's safety, unblinding may be done.

Data Collection And Management

Plans for assessment and collection of outcomes {18a}

All demographic and clinical data will be entered into paper-based case record forms. Videographic data taken at the time of intubation will be stored with identifier codes. They will be analyzed separately by an experienced anaesthesiologist from the investigating team who is not aware of the group allocations and a blinded assessor who is not part of the study team.

The case record forms can be collected by emailing the corresponding author of this manuscript.

Plans to promote participant retention and complete follow-up {18b}

As the patient will be with the same anesthesia team, retention will not be a significant concern once recruited. However, at the time of writing this manuscript for protocol submission (midway of the study), the COVID pandemic started- this affected the methodology of intubation- limiting the number of personnel in the room and the use of PPE, which might have affected the primary outcome- the number of intubations had also reduced, so we approached the IEC for allowing the inclusion of patients undergoing emergency surgeries (non-COVID suspect) and those with any Mallampatti scores (previously we were excluding those with MPG III and IV) and for an interim analysis to assess for stopping the trial or amendment in sample size.

Data management {19}

All data (case record forms and videos) will be stored in a password-protected computer in an excel spreadsheet for further analysis. All measures will be taken to provide a backup of stored data in case of data loss.

Confidentiality {27}

The participants' identity and sensitive personal details will remain confidential with the principal investigators and will not be disclosed in any form.

Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in this trial/future use {33}

No biological specimens will be collected in this study.

Statistical Methods

Statistical methods for primary and secondary outcomes {20a}

A researcher blinded to the group allocation will perform the statistical analysis of all randomized patients using the SPSS for Windows software (ver. 18.0; SPSS Inc., Chicago, IL, USA) on completion of the study. For presenting the demographic data, the categorical data (like gender, ASA status) will be presented either as the Odds Ratio or percentage of the total, while the quantitative data will be presented as means with standard deviations. All the primary outcome data, namely Time to intubation and the IDS, are quantitative and will be presented as means with standard deviations. The Chi-square test will be used for categorical data. The Kolmogorov-Smirnov test will be used to check the normality of the

quantitative variables' distribution, and the Mann-Whitney U test or independent t test will be used for the quantitative data, including the primary outcome variables depending upon the normality of distribution.

Interim analyses {21b}

An interim analysis is planned after one hundred and twenty cases and approval granted from the ethics committee. The senior-most researcher (ST) will have access to the results of the interim analysis.

Methods for additional analyses (e.g. subgroup analyses) {20b}

Subgroup analysis is not planned for the study.

Methods in analysis to handle protocol non-adherence and any statistical methods to handle missing data {20c}

Sensitivity analysis will be done to handle the missing data. Missing data will be handled with multiple imputations. Per protocol and ITT analyses will both be done.

Plans to give access to the full protocol, participant level-data and statistical code {31c}

Reasonable access to the protocol and other documents can be made by requesting the corresponding author.

Oversight And Monitoring

Composition of the coordinating center and trial steering committee {5d}

Two senior anesthesiologists from the investigating team will review the adherence to trial protocol and overall conduct of the trial every two months throughout the study period.

The institute research committee also oversees the regular progress of academic dissertation-based research.

Composition of the data monitoring committee, its role and reporting structure {21a}

Since the study does not involve any new intervention and endotracheal intubation is a regular procedure done in operating rooms under senior anesthesiologists' guidance, the IEC did not call for a DMC appointment.

Adverse event reporting and harms {22}

Endotracheal intubation is a very safe procedure, and no new intervention will be investigated. Hence we do not expect any unexpected adverse events to happen during the study.

Frequency and plans for auditing trial conduct {23}

We do not have any plans for conducting audits of trial conduct as the study is done as a routine procedure for elective operated patients in healthy patients under senior anesthesiologists' guidance.

Plans for communicating important protocol amendments to relevant parties (e.g., trial participants, ethical committees) {25}

This study was approved by the Institutional Ethics Committee of All India Institute of Medical Sciences, Bhubaneswar, on 15th July 2019 and registered on ctri.nic.in (CTRI/2019/09/021201) on 12th September 2019. Any amendments in protocol will have to be informed to and approved by the Departmental academic lead, head of the department, the institutional research committee, and IEC before being uploaded to the trials registration body.

Dissemination plans {31 a}

The results obtained from this study will be disseminated at anesthesia conferences (local and international meetings). The key findings will be reported in the trial registry. A complete study report will be submitted for publication in an anesthesia journal, preferably an open-access journal.

Discussion

It is already known that the first pass intubation rate performed by trainees depends on the years of experience. Hence, systematic training of technical and non-technical skills is essential for procedural success. As per a review in the first 100 intubations done by a trainee, the early intubations' major problems were esophageal intubations and achieving an optimal view. Positioning of the patient and laryngoscopy technique are the two most important factors for achieving an optimal view during direct laryngoscopy. This study will first assess the optimal site of holding ET for successful LEI when performed by the trainees. The holding site can impact the visual axes and the torque applied to the endotracheal tube. Whether this will impact the incidence of complications like bleeding and sore throat is not known.

Trial Status

This study was approved by the Institutional Ethics Committee of AIIMS, Bhubaneswar, on 15th July 2019 and was registered in CTRI on 12th September 2019. The first participant was recruited on 16th September 2019, and currently, the study is in ongoing status.

Declarations

Acknowledgements

We acknowledge the Department of Anesthesia and Critical Care faculty's help, especially Dr. Satyajeet Misra, whose ideas strengthened the methodology during the 'Thesis Protocol Presentation' at the institute.

We also regard beneficial the help and support from the OT staff.

Authors' contributions {31b}

ST conceived the study and led the proposal and protocol development. NM and MS contributed to the study design and the development of the proposal. ST and MS were the lead trial methodologist. ST and NM supported by reading the manuscript critically and providing relevant comments. All authors reviewed, read, and approved the final manuscript. All named authors adhere to the authorship guidelines of Trials; the authors have agreed to the publication and have contributed to the manuscript's writing. No professional writer has been involved.

Funding {4}

No extramural funding will be required for the conduct of this study.

Availability of data and materials {29}

The data generated in this study can be shared after a reasonable request to the corresponding author of the manuscript.

Ethics approval and consent to participate {24}

The Institutional Ethics committee has approved the study of AIIMS, Bhubaneswar, on 15th July 2019.

Consent for publication {32}

Not applicable

Competing interests {28}

All the authors declare that they have no competing interests.

Authors' information (optional)

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ST is a senior anesthesiologist-intensivist who has been actively engaged in MBBS, post-graduate, nursing, emergency medicine, and critical care training programs. She is a faculty for Comprehensive Trauma Life Support,⁸ BASIC⁹, and FCCS¹⁰ courses wherein trainees learn intubation on mannikins and an additional professor training post-graduate and MBBS students in the operation theatre, emergency, and critical care units.

Abbreviations

ET- endotracheal tube, ASA- American Society of anesthesiologist, IDS- intubation difficulty score, MPG- Mallamapati grading OT- operating theatre, SD- standard deviation

References

1. Konrad C, Schüpfer G, Wietlisbach M, Gerber H: Learning manual skills in anesthesiology: Is there a recommended number of cases for anesthetic procedures? *Anesth Analg* 1998; 86:635–9
2. Alvarado AC, Panakos P: Endotracheal Tube Intubation Techniques. *StatPearls* 2020:1–7 at <<http://www.ncbi.nlm.nih.gov/pubmed/32809565>>
3. Hung T-Y, Lin L-W, Yeh Y-H, Su Y-C, Lin C-H, Yang T-F: The evaluation of a better intubation strategy when only the epiglottis is visible: a randomized, cross-over mannequin study doi:10.1186/s12871-018-0663-9
4. Mulcaster JT, Mills J, Hung OR, MacQuarrie K, Law JA, Pytka S, Imrie D, Field C: Laryngoscopic intubation: Learning and performance. *Anesthesiology* 2003; 98:23–7
5. Lee H-C, Yun M-J, Hwang J-W, Na H-S, Kim D-H, Park J-Y: Higher operating tables provide better laryngeal views for tracheal intubation. *Br J Anaesth* 2014; 112:749–55
6. Adnet F, Borron SW, Racine SX, Clemessy JL, Fournier JL, Plaisance P, Lapandry C: The intubation difficulty scale (IDS): Proposal and evaluation of a new score characterizing the complexity of endotracheal intubation. *Anesthesiology* 1997; 87:1290–7
7. Reed MJ. Intubation training in emergency medicine: a review of one trainee's first 100 procedures. *Emerg Med J.* 2007 Sep;24(9):654-6. doi: 10.1136/emj.2007.048678. PMID: 17711945; PMCID: PMC2464670
8. Comprehensive Trauma Life Support - Service Provider from Karungalpalayam, Erode, India | About Us at <<https://www.indiamart.com/comprehensive-traumalife/aboutus.html>>
9. Basic Assesment and Support in Intensive Care course at <<https://www.aic.cuhk.edu.hk/web8/BASIC.htm>>
10. Fundamental Critical Care Support Courses | SCCM at <<https://www.sccm.org/Fundamentals/Fundamental-Critical-Care-Support>>

Figures

Figure 1

P1,2,3 are the pivots around which the endotracheal tube will move if held at. d1,2,3 are the corresponding distances from the pivots, which will influence the negative torque (clockwise swing of the posterior part of the ET). As illustrated, it will be maximum at P2 and least at P3.