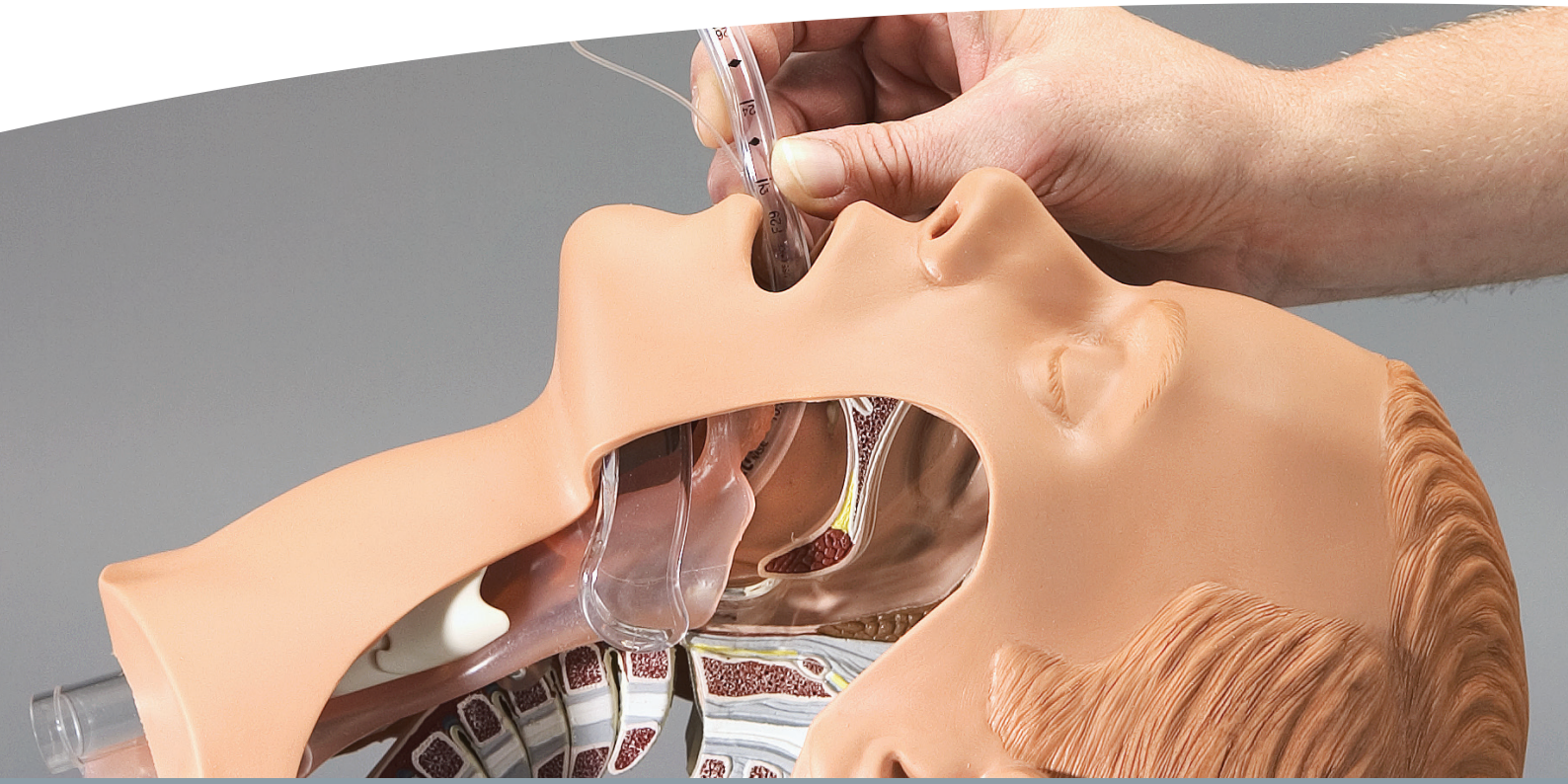
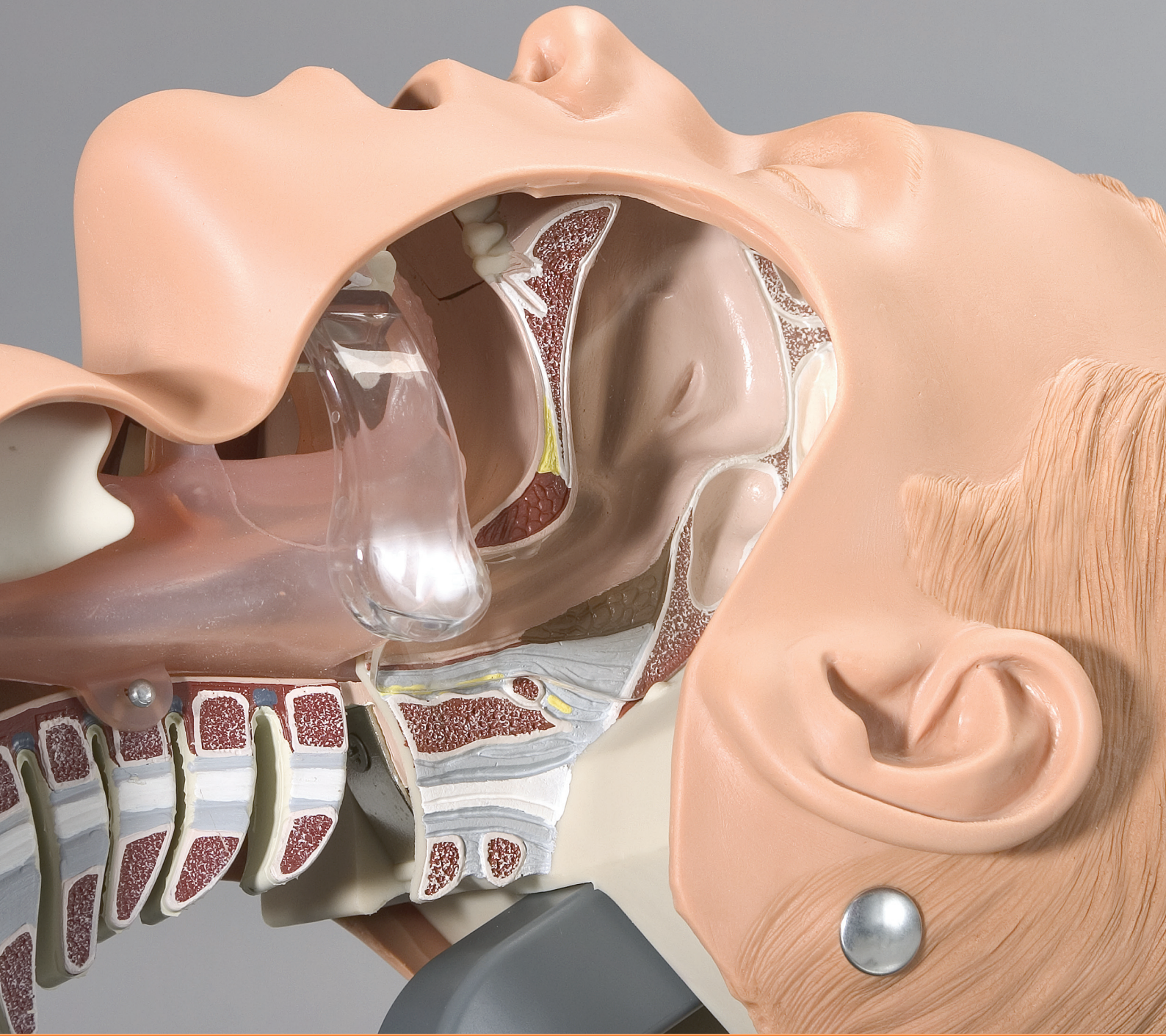
Ideas that work for life

Ambu



A systematic guide to intubation

TRAINING

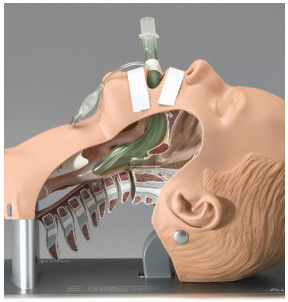


A systematic guide to intubation

Not only anesthetists, but all doctors working on intensive care wards, in casualty, and on accident and emergency units must be able to carry out the technique of intubation and all associated procedures even under difficult conditions. The basic principles involved should also be known to all other medical personnel working on anesthetic and intensive care units, to paramedics, medical students, and also to all doctors irrespective of their speciality. The various techniques involved must be systematically learnt and well trained in order that they can be rapidly and easily carried out under all circumstances. Teaching intubation on the live patient is hampered by the problem that the time span available for seeing and learning has to be kept very brief in order to avoid the patient becoming hypoxic. A further important point is the fact that an unexperienced trainee is more likely to unwittingly cause damage to the patient. Only those anesthetists working in operating theatre have adequate opportunity to learn the technique of intubation on the live patient. These reasons alone suffice to make the development and use of an intubation model necessary for the first stages of training. The use of an intubation trainer allows each procedure to be repeated as often as necessary and gives the trainer ample opportunity to correct any mistakes made. Armed with the knowledge thus acquired, the beginner can, under supervision, gain experience in the intubation of patients without being distracted by any slight interindividual anatomical variations which may be present. This model can also be of service to those experienced in intubation in that it allows the opportunity of obtaining manual dexterity in techniques which only rarely need to be carried out. The presentation of this book has been so arranged that the material to be covered is split into a number of topics each of which are dealt with in the same manner, with the complementary use of diagrams and text to explain the techniques described. It has been written both as a preparation for the practical part of training on the intubation trainer, and, on completion of training, as a revision of the material learnt. Each stage of the practical part of training must however be demonstrated and explained by an experienced teacher who must also ensure that the trainees carry out all the techniques correctly.

Content

Ambu® **Laryngeal Mask**



The Ambu Laryngeal Mask features a special curve that carefully replicates natural human anatomy. This ensures that the patient's head remains in a natural, supine postition when the mask is in use.

Single use.
Multiple advantages.
No compromise.

As a sterile, single-use product, the innovative Ambu mask significantly reduces the risk of cross-contamination and other hazards, yet it is also remarkably cost-effective to use.

State-of-the-art production methods enable us to incorporate a wide range of features not found in other similar devices – reusable and disposable alike. For example, the Ambu Laryngeal Mask features a special curve that carefully replicates natural human anatomy.
This curve is moulded directly into the tube so that insertion is easy, without abrading the upper airway. Moreover, the curve ensures that the patient's head remains in a natural, supine position when the mask is in use. Internal ribs built into the curve give the airway tube the flexibility needed to adapt to individual anatomical variations and a wide range of head positions.

Unlike most masks, which have relatively thick cuffs to help withstand repeated use, the Ambu Laryngeal Mask features an extra soft 0.4mm cuff. Thus, the seal more readily conforms to the shape of the airway with significantly less internal pressure. Although the cuff is flexible, the tip itself is thicker. This helps prevent folds during insertion which can cause improper positioning and possible airway trauma.

The cuff, mask, and airway tube are moulded in a single unit. As a result, the quality of each and every Ambu Laryngeal Mask is 100% uniform. This unique moulding process also ensures that the cuff and tube are free from ridges or fins that can scratch the walls of the patient's airway.

Ambu® **Airway Management Trainer**

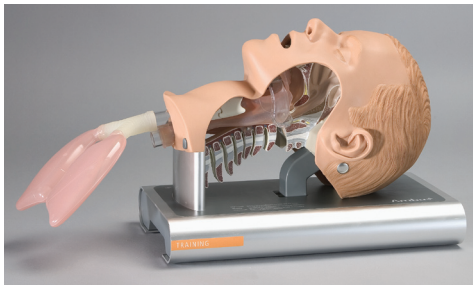
The Ambu Airway Management Trainer is for teaching intubation techniques with laryngoscopes, airways, endotracheal tubes, nasotracheal tubes, Laryngeal Mask, Combitube and other auxiliary aids for airway management. The accurate simulation of mouth, nostrils, teeth, tongue, pharynx, larynx, epiglottis, vocal cords, trachea, oesophagus and lungs, make it the most realistic Airway Management Trainer on the market. Realistic lifting and tilting of the (trainer) head gives you the right feel. Realistic movement of the head, cervical spine and jaw simulate relevant anatomical changes during intubation.
The left side of the head is open, permitting supervision of the student's performance. The walls of the pharynx and trachea are transparent, enabling the student to follow the tube down the throat. Training is possible with orotracheal tubes, Laryngeal mask, Combitube, nasotracheal tubes, nasopharyngeal tubes and Guedel airways, allowing you to use whatever equipment you are familiar with. Acoustic signals triggered by excess pressure on the teeth help the student to correct mistakes. If desired, signal sensitivity can be adjusted.

REALISTIC SIMULATION

Realistic simulation of the anatomic changes caused by movement of the head, cervical spine and jaw and the anatomic features relevant to airway management training.

HEAD

The 53 cm (circumference) head is proportional to the average human head. The left side of the head is open, permitting the mouth, throat and trachea to be clearly seen from the side. This makes it simple to supervise the trainee's performance and involve the whole class in the training program.



TONGUE-PHARYNX

Tongue, pharynx, larynx, trachea and oesophagus are moulded in one part, allowing realistic sighting of the epiglottis and vocal cords down through the mouth.

BRONCHIA-LUNGS

Following successful intubation, the lungs may be inflated, for example by a manual resuscitator. The bronchus is designed so that either both lungs or only one lung can be ventilated (for example with acariens or a Robertshaw tube).

Basic Anatomy

General comments

On its way into the lungs, inspired air first passes through the nose, then the throat, larynx, trachea, and down the many branches of the bronchi before finally reaching the air sacs (alveoli). Here, oxygen passes into, and carbon dioxide out of, the blood. The nose, mouth and throat are collectively termed the upper airway, while the larynx trachea and bronchial tree, are known as the lower airway.

The nasal cavity serves to warm and humidify the inspired air, and as a filter for fine particulate matter. These functions are not adequately fulfilled during mouth breathing. The larynx and vocal cords lie at the entrance of the trachea. While swallowing, and on contact with foreign matter, the vocal cords are automatically closed. In this way, the passage of foreign material into the lower airways is prevented. These lower airways distribute the inspired air to the alveoli through their tree-like series of branches.

Although the primary function of the mouth is the up-take and mastication of food, it can also act as an airway. On swallowing, during which the tongue plays an important role, a semi-solid bolus of food is passed over the area of the larynx and vocal cords and into the esophagus.

The oral and nasal cavities, larynx and esophagus all open into the same space, the pharynx. This area is divided into three parts: the nasopharynx, the oropharynx, and the laryngeal part of the pharynx. The pharynx extends from the base of the skull down to the beginning of the esophagus, and lies behind the nasal and oral cavities and the larynx. Its borders lie at the posterior apertures of the nose (choanae) and the soft palate. The posterior wall of the pharynx, which is composed of a thin sheet of muscle, lies directly on the vertebral bodies of the upper part of the spine. The whole pharyngeal cavity is lined by mucous membranes. In the oropharynx the airway crosses the passage taken by food and continues in front of this passage.

The most vulnerable part of the airway is at the level of and just below the oropharynx. It is at this site that the tongue of an unconscious person can sink backwards and partly or completely obstruct the passage of air into the lower airways. As a result of the food- and airway lying so close together at this level, food, vomited matter, secretions and blood can enter the lower airway of an unconscious person because the protective reflex, which normally would close the larynx, no longer functions. The aspiration of foreign matter can then block the lower airways and cause extensive damage to the lungs.

The connection between mouth and pharynx is of importance when an artificial route has to be placed to the lower airways. In particular because correct positioning of the patient's head and use of an illuminated blade allow direct vision down to the entrance of the larynx from outside the mouth. Without the use of such an

Basic Anatomy

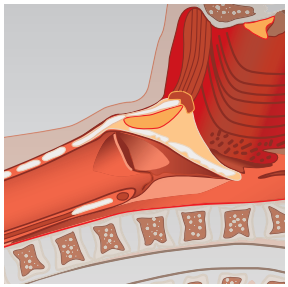
instument vision would be obscured by the tonque. A free airway is achieved by connecting the upper and lower parts of the airway system by means of air pipelines from either the opening of the nose or mouth down to pharynx, to a point just above the larynx, or down into the trachea. An exact knowledge of the anatomy of the upper part of both the airways and gut is absolutely necessary before attempting to master techniques to be carried out in this area.

The epiglottis and vocal cords

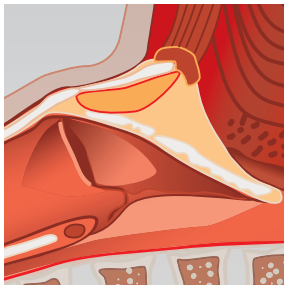
The epiglottis is a leaf-shaped blade of cartilage which lies over the entrance of the larynx. It is attached to the thyroid cartilage by firm but supple connective tissue and is therefore mobile. The larynx is pulled upward during the act of swallowing so that the epiglottis automatically falls over and protects the vocal cords. This entrance to the lower airways is also guarded by the 20 -50 mm long vocal cords which lie anteroposteriorly in the larynx with the glottis between. In adults, the glottis is 11 -16 cm from the teeth. The size of the glottis opening can be altered at the posterior end by muscle traction on the arytenoid cartilages.
The maximal width is 8 mm. The vocal cords are fixed posteriorly to the arytenoid cartilages, anteriorly via flexible connective tissue, to the cartilage.

The larynx

The larynx is formed from a number of cartilages, which are connected together by joints, ligaments and muscle in such a way that the component parts are movable. The upper end reaches into the pharynx, while the lower end is continuous with the trachea. The form of the thyroid and cricoid cartilages determines the external shape of the larynx. The paired arytenoid cartilages of the vocal cords are not visible externally. Two plates joined together in front at an acute angle form the thyroid cartilage. This structure can easily be felt through the skin, and in some men can be seen as a prominence at the front of the neck, when it is often called an "Adam's apple". The cricoid cartilage is approximately signet-ring shaped and can be felt, together with the ligament connecting it to the thyroid (the cricothyroid ligament) below the "Adam's apple". This ligament is the site at which the larynx can be cut open when in particularly difficult emergencies the upper airways cannot otherwise be cleared (cricothyrotomy).

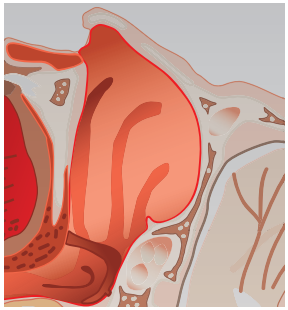


The larynx



The epiclotis and vocal cords

Basic Anatomy



The nasal cavity and nasopharynx

The nasal cavity is divided into two halves by the nasal septum. Each half begins at its respective external nasal orifice and ends at the soft palate by opening at the choanae into the upper part of the pharynx; the nasopharynx. The nasal cavity is lined by very sensitive mucous membranes which have a rich blood supply. The midline nasal septum is smooth on both sides while the outer walls of the nasal cavity bear three thin plates of bone, the conchae, which are cover ed by erectile tissue. The flat lower border of this cavity is formed by the hard palate. Between these nasal bones lie an upper and middle meatus, or passage, and a further lower meatus lies between the lower conchae and the hard palate at right angles to the surface of the face from where it passes backwards in the direction of the posterior pharyngeal wall.

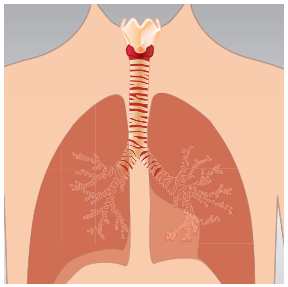
Oral and oropharynx

The external boundaries of the oral cavity are formed by the lips, cheeks and teeth. The hard and soft palate lie above, and the tongue below this cavity, and the arch of the palate and root of the tongue lie at the posterior boundary. The posterior continuation of this area is the oropharynx where the upper airway is crossed by the route taken by food. The entrance to the esophagus lies right behind the larynx. The hard palate, being part of the upper jaw, is firmly connected to the base of the skull, and it acts as both the roof of the oral cavity and the floor of the nasal cavity. The floor of the mouth is formed by the musculature of the tongue which in turn is fixed to the U-shaped lower jaw which is bent upward at its posterior end. The mouth opens when the lower jaw pivots at the joint formed between this bone and the base of the skull. The angle of the jaw is that point at which pressure is applied during the jaw lift which will be described later.

Basic Anatomy

The trachea

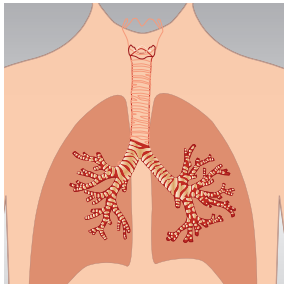
The trachea (windpipe) begins at the lower end of the larynx and ends by branching into the right and left main bronchi. In adults it is 10 -12 cm long and 1.5 -2.0 cm in width. This part of the airway is made up of C-shaped pieces of cartilage, all with their opening facing posteriorly, connective tissue and muscle. The segments of cartilage give stability to the walls of the trachea, the inner surface of which is lined with mucous membranes which have a rich supply of nerve endings. When these nerve endings are stimulated, coughing is elicited. The trachea divides into two main bronchi.



The trachea

The bronchial tree

In the adult, the right main bronchus takes a steeper course, i.e. it lies nearer the midline, than the left main bronchus. Somewhat like the branches of a tree, the main bronchi divide into lobar and then into segmental bronchi. Further branching then leads to the formation of ever smaller airways which after branching some 20 -25 times end in the air sacs of the lung (alveoli). It is here that gas exchange takes place. Apart from the most peripheral branches, the stability of the bronchial system is maintained by the cartilaginous plates embedded in the airway walls. Like the trachea, the bronchial airways are lined with mucous membranes which are covered with fine ciliary hairs. Just before reaching the alveoli, this mucous membrane gives way to a thinner layer of cells which are adapted to allow gas exchange.



The bronchial tree

Equipment

Endotracheal tubes, tubing and catheters

A variety of endotracheal tubes, catheters, and tubing made of rubber or soft plastic material have been developed for introduction into the oral- nasal- and pharyngeal cavities, and into the trachea and esophagus. It should be said at this point that the nomenclature of this equipment is more the result of time-honored usage than of strict logic. Various tubes can be used to keep the airway patent. These may be in the form of pharyngeal airways or endotracheal tubes. Both types of airway can be introduced through the mouth or nose. Tubes with a single curvature such as the Magill endotracheal tube can be used for both oral and nasal Intubation while certain tubes which have been adapted to fit the anatomy more closely (Kuhn- and Oxford non-kinking tubes) can only be used for oral Intubation. The most commonly used pharyngeal tubes are the oropharyngeal Guedel airway which is moulded to fit the roof of the mouth, and the Wendl nasopharyngeal airway which is basically a slightly modified soft rubber tube.

Lengths of thin tubing, more correctly termed suction catheters, are used to aspirate secretions from the mouth, pharynx and trachea, Thicker tubes are necessary to empty the contents of a full stomach or to carry out gastric lavage.

Further aids and apparatus

A series of instruments and aids is necessary in order to place these various tubes and catheters correctly, and to keep them in position, aspirate secretions through them, and to insufflate air or oxygen. Among these, the laryngoscope is of particular importance because with the help of this instrument direct vision of the throat down to the larynx can be gained. The manipulation of catheters and tubes lying in the pharynx is carried out with a specially designed, angled pair of forceps known as Magill forceps. The introduction of those endotracheal tubes made of soft pliable materials is facilitated by the use of a stylet. Before passing tubes or catheters through the upper airways their outer surface must be lubricated. This can be done by spraying with silicone or by impregnating them with a thin layer of gel that contains a local anesthetic. A 10 ml syringe is usually used to inflate the cuff of endotracheal tubes when, in addition to plugging the conical funnel of the insufflation channel, air tightness is insured by placing a pair of self-locking metal forceps proximal to the pilot balloon. Tubes and catheters are kept in place with adhesive tape or tubeholder.

Techniques, Positioning of the head

The Airway Management Trainer

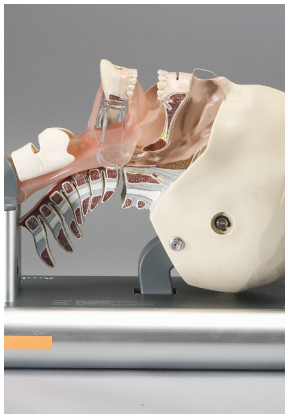
The Ambu Airway Management Trainer is a model of the head and neck fixed to a metal base plate. The oral and nasal cavities, larynx, pharynx and adjoining parts of the anatomy have been made as lifelike as possible with respect to size, flexibility and degree to which they can be deformed. The use of a specially designed joint allows the head to be turned in the transverse plane and lifted at the same time. A lateral opening on the left of the model allows an internal view of the nasal cavity and the oropharyngeal area, while a midline section of the spine, and the base of the skull enables a closer understanding of the topography of this region. All the manipulations carried out can be observed through this lateral opening so that the tutors have an additional means of demonstrating the right technique and also of immediately correcting any mistakes that the trainee might make. The two pseudo-lungs attached to the trachea allow immediate proof that Intubation has been successful by inflating on ventilation.
The following chapters have been designed as an introduction to, and as a basis for the training of practically all techniques and subsidiary manipulations, which serve to clear the upper airways and to keep, them patent. Most of the steps taken in this training are described using the Ambu Airway Management Trainer.

Positioning of the head

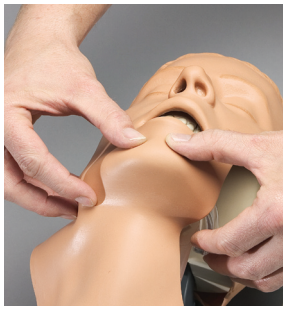
Correct positioning of the head is of utmost importance if the following techniques are to be carried out successfully. The cervical spine of an unconscious patient, who is lying on his back, is extended, while his head is bent forward to a moderate or slight degree. In this position the upper airways are blocked at the level of the oropharynx as a result of the jaw and tongue sinking backward.

Hyperextension

The upper airway forms a marked curve around the root of the tongue. The axes between oro- and nasopharynx and the trachea are approximately at right angles to each other. This leads to problems in the management of respiratory disturbances. Hyperextension of the head tends to align the axes of the upper and lower airways. The lower jaw and tongue are brought forward so that the tongue can no longer obstruct the airway.
To hyperextend the head, one hand supports the nape of the neck while the other is placed on the forehead. By lifting the neck slightly and at the same time pushing the forehead down, the head is automatically brought into the correct position. Should a semiconscious patient be restless, this hyper extended position will have to be corrected repeatedly.

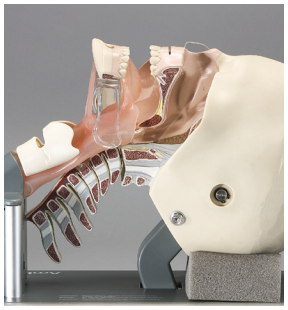


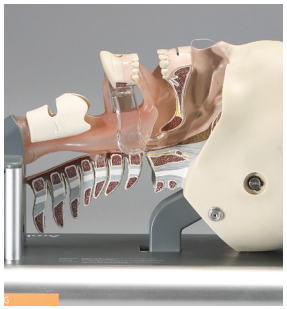
Positioning of the head



The jaw thrust

The jaw thrust is an additional, complementary method of bringing the tongue forward. The head is first hyper- extended and with the hands placed on both sides of the head, the jaw bone is pushed upward and forward from the angle of the jaw with the index and middle fingers while at the same time the mouth is opened slightly by pushing the thumbs against the chin (only adults).



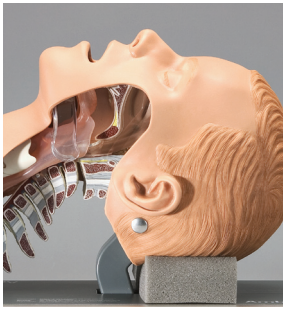


The "sniffing position"

One of the most important prerequisites for successful Intubation is being able to see the vocal cords using instrumentation in the mouth. This is achieved by using a cushion (pillow), so that the head is raised by about 10 cm and the neck extended. From this position, all that need be done in order to directly visualize the larynx is to lift up the root of the tongue with the blade of the laryngoscope. This "sniffing position", which is also known as the modified Jackson position, gives the best possible conditions for endotracheal Intubation. Because the details of anatomy can vary considerably from one individual to the next, it may in some cases be necessary to alter the thickness of the cushion, or the inclination of the head, in order to get an optimal view.

Flexion of the head

Flexion of the head increases airway obstruction at the level of the oropharynx. Should Intubation be attempted in this position, the vocal cords cannot be seen. This position is suitable, however, for the introduction of a nasogastric tube in patients who are unconscious or intubated. Attempting to ventilate a patient mouth to mouth/nose or using a bag-valve-mask device with the head in this flexed position will result in a build-up of pressure in the oropharynx. Instead of going down the trachea the insufflated air is forced into the esophagus that opens at its far end when a pressure of about 15 cm H2O is applied. Air then enters and fills the stomach. This forces the diaphragm upward that in turn hinders expansion of the lungs. This insufflation of the stomach can also force any gastric contents which happen to be present up into the oropharynx (regurgitation), should the patient be so deeply unconscious that no protective reflexes are present, passively flow into the airway (aspiration).



Orotracheal intubation

Opening the mouth with the crossed fingers maneuver

The patient's mouth is opened with the right hand using the so-called crossed fingers maneuver. The thumb is crossed over the bent index or middle finger, the tip of which is placed against the biting surface of the upper incisors. This finger then pushes upward on the teeth in the direction of their axis, while the thumb pushes the lower incisors downward to open the mouth.

Crossing one's fingers in this way utilizes the fact that more strength can be applied when the fingers are bent than when they are stretched or spread.

Introducing the laryngoscope

The handle of the laryngoscope is held from below near the point of its center of gravity using the left hand. The blade is then introduced into the right-hand corner of the opened mouth and is slowly passed over the tongue with the tip of the blade directed toward the middle of the, root of the tongue. By moving the laryngoscope into the midline, the tongue is then pushed to the left. Under direct vision the blade is then moved forward over the root of the tongue toward the epiglottis.

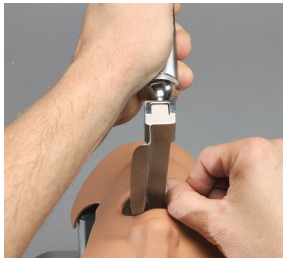
Locating the epiglottis

The epiglottis comes into view when the laryngoscope blade has been introduced far enough in the correct direction.

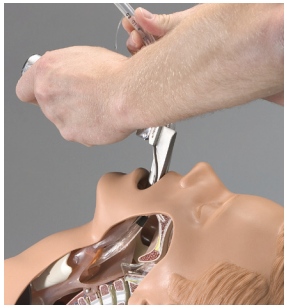
If the epiglottis cannot be seen despite the fact that the whole blade has been introduced, one has either slipped away from the midline or the epiglottis has unwittingly been lifted onto the blade. The tip of the blade must have lost contact with the tongue for this to occur. In both cases the blade should be withdrawn slightly and the direction corrected before the tip is again advanced.

Pulling the epiglottis upward

The epiglottis can be made to tilt upward as a result of its being fixed at only one edge to the area between the root of the tongue and the larynx. When this area is pushed upward from the larynx, the epiglottis automatically tilts upward at its tip.



Orotracheal intubation



Grasping the endotracheal tube

While the left hand keeps the laryngoscope in place with the glottis in vision, the right hand grasps the endotracheal tube in such a manner that the tube can be immediately inserted. Ideally, an assistant should hand the tracheal tube.

Insertion of the endotracheal tube

The Endotracheal tube is introduced along the curvature of the arc formed by the route of intubation and the tube itself into the right-hand corner of the mouth. The tip of the tube is directed toward the glottis into which it is then carefully inserted. While maintaining visual control, the tube is gently pushed forward into its final position, which is reached when the upper end of the cuff lies about 2 cm below the glottis or as indicated on the tube.

Fixing the endotracheal tube in place

The tube is held in the right-hand corner of the mouth with the thumb and index finger of the right hand, which in turn rests on the patient's cheekbone. The laryngoscope blade is then carefully removed with the left hand.

Inflating the cuff

Once intubation has been completed, the cuff of the tube must be inflated as soon as possible in order to ensure an airtight seal with the trachea. Adults usually require 5-8 ml air to seal off the trachea. The cuff should be inflated while the patient is being ventilated because the amount of air necessary for an airtight seal can then best be estimated. The noise caused by air escaping between the tube and trachea can at first easily be heard, and gradually disappears as the seal tightens. In order to prevent damage to the tracheal mucosa caused by high cuff pressures, it is a basic principle to only inflates the cuff so far that no gas escape occurs.

Orotracheal intubation

Fixing the tracheal tube in place

The endotracheal tube is fixed in place with a strip of adhesive tape that is attached to one cheek, is wound once around the tube and then attached to the other cheek. This tape also prevents the airway from slipping out. A second strip of tape, wound in the opposite direction, helps to ensure that the tube does not slip out of place. Alernative, use a tube holder

Manual ventilation

It is relatively easy to ventilate an intubated patient either by exhaled air ventilation or by means of mechanical aids. At the site of an accident or emergency, this will be a bag-valve device (Ambu bag) or a portable respirator. Oxygen can be added to the inspired air when such mechanical aids are used. The patient should be ventilated at a respiratory rate of 12 -16/min, with a volume of 500 -800 ml per cycle depending on body weight.

Supraglottic Airway devices

With Ambu Laryngeal Mask

Pre-insertion preparation

Before inserting the Ambu Laryngeal Mask, the cuff should be completely deflated so that the cuff is flat and free of wrinkles. Simply press the cuff down onto a flat sterile surface while at the same time deflating the device with a syringe. Complete deflation results in a shape like the rim of a saucer, and facilitates insertion and correct positioning of the device.
To further facilitate insertion into the Airway Management Trainer, a water-based lubricant should be applied on the distal posterior surface of the cuff.

Position of the head

The head position should be extended with flexion of the neck in the position normally used for tracheal intubation (see page11-12).

Insertion Techniques

The following points are extremely important:

- Check for correct deflation and lubrication as described above.
- The size of the Ambu Laryngeal Mask must fit the patient. We recommend size 3 in Ambu Airway Management Trainer
- Pre-oxygenate and implement standard monitoring procedures.
- Check that the level of anesthesia (or unconsciousness) is adequate before attempting insertion.
- Never use excess force.

Insertion Techniques

There are many insertion techniques currently in use. Insert the Ambu Laryngeal Mask in accordance with currently accepted medical techniques.
The commonly used techniques are the Index Finger Technique or the Pencil technique that is described below.

The Pencil Technique

The advantages with this technique is the easy placement of the mask and the fact that you don't put your finger into the patients mouth

The airway tube is held like a pen, with the tree fingers placed just above the curve at the tube and the black line on the airway tube oriented toward the patient's nose. Your other hand should be placed on the patient's forehead.

Supraglottic Airway devices

... The Pencil Technique

Insert the tip of the cuff pressing upwards against the hard palate and flatten the cuff against it. Look carefully into the mouth to verify that the tip of the cuff is correctly flattened against the palate before proceeding – push the jaw gently downwards with other hand to open the mouth further, if necessary.

Advance the Ambu Laryngeal Mask into the hypopharynx until a definite resistance is felt. Do not hold the jaws open during this movement as this may allow the tongue and epiglottis to drop downwards, blocking passage of the mask. Depending on patient size, your fingers may be moved upwards the tube before resistance is encountered.. The Ambu Laryngeal Mask should now be correctly located with its tip pressed against the upper esophageal sphincter.

Index Finger Technique

Provided that access to the patient's head from above is feasible, the index finger insertion technique provides a good positioning of the mask. The airway tube is held like a pen, with the index finger placed at the junction of the cuff and the tube and the black line on the airway tube oriented anteriorly toward the patient's nose. Your other hand should be placed under the patient's head.

Insert the tip of the cuff pressing upwards against the hard palate and flatten the cuff against it. Look carefully into the mouth to verify that the tip of the cuff is correctly flattened against the palate before proceeding – push the jaw gently downwards with your middle finger to open the mouth further.

As your index finger enters the mouth, the finger joints begin to extend. Using the index finger, press backwards toward the other hand, which now exerts counter-pressure. Do not use force. Advance the Laryngeal Mask into the hypopharynx until a definite resistance is felt. Do not hold the jaws open during this movement as this may allow the tongue and epiglottis to drop downwards, blocking passage of the mask.
Depending on patient size, your index finger may be inserted to its fullest extent into the oral cavity before resistance is encountered. Before removing your finger, carefully remove your other hand from behind the patient's head and press down on the airway tube. This prevents the Laryngeal Mask from being pulled out of place when the finger is removed, and also permits completion of the insertion should this not have been achieved by means of the index finger alone. The Laryngeal Mask should now be correctly located with its tip pressed against the upper esophageal sphincter.

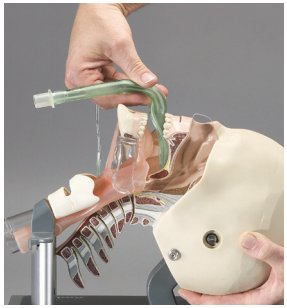

The Pencil Technique


The Pencil Technique

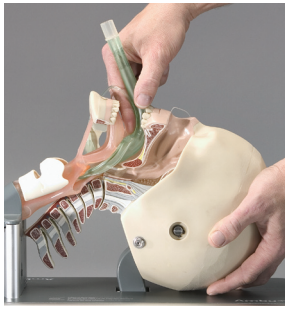

The Pencil Technique

Supraglottic Airway devices

The Index Finger Technique



The Index Finger Technique



The Index Finger Technique

Inflation

After insertion, the black line on the airway tube should be oriented anteriorly toward the patient's nose. Without holding the tube, inflate the cuff with just enough air to obtain a seal, equivalent to intracuff pressures of max 60 cm H2O. In many cases, only half of the maximum volume is sufficient to achieve a seal – please refer to Direction for use for maximum volumes.

Insertion Problems

The tube must be pressed against the palate throughout or else the tip may fold on itself or meet an irregularity in the posterior pharynx, e.g. hypertrophied tonsils.
Should the cuff fail to flatten or begin to curl over as it is inserted, withdraw the mask and reinsert it. In case of tonsillar obstruction, a diagonal movement of the mask is recommended.

Never over-inflate the cuff.

Avoid prolonged intracuff pressures greater than max 60 cm H2O. The initial cuff pressure varies according to patient, mask size, head position, and depth of anesthesia. Do not hold the tube during inflation as this prevents the mask from seating itself correctly. A small outward movement of the tube is often seen as the mask settles into the hypopharynx.

Look for the following signs of correct placement: the slight outward movement of the tube upon cuff inflation, the presence of a smooth oval swelling in the neck around the thyroid and cricoid area, or no cuff visible in the oral cavity.

Supraglottic Airway devices

Connecting to the Anesthetic System

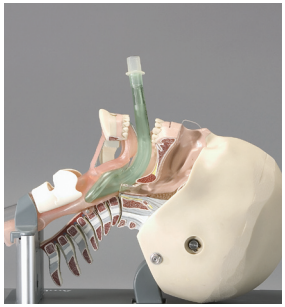
Carefully connect the Ambu Laryngeal Mask to the anesthetic circuit and initiate gentle manual ventilation to airway pressures, looking for any signs of leakage.

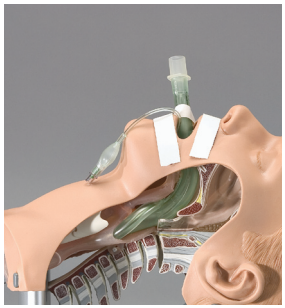
The mask may leak slightly for the first three or four breaths before settling into position in the pharynx. In case leakage persists, check that there is adequate depth of anesthesia and that the pulmonary inflation pressures are low before assuming that reinsertion of the Ambu Laryngeal Mask is necessary. If leakage persist, reinsert the mask, also consider another size mask.

As with other methods of airway management, use of pulse oximetry and capnography is recommended when using the Ambu Laryngeal Mask. The mask may be used for either spontaneous or controlled ventilation.

Fixation

Secure the Ambu Laryngeal Mask to the patient's face with adhesive tape or with a mechanical tubeholder suited for this purpose. Do not use an oral Guedel airway as a bite block because it will prevent correct positioning of the mask increasing the risk of trauma and reducing seal effectiveness. Ambu Laryngeal Mask has a built-in bite block due to the rigid airway tube, however, the use of a gauze bite block is recommended.





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