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CPR TRAINING MODELS IMPROVE TECHNICAL SKILLS OF THE RESUSCITATORS

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The most important prerequisite for successful CPR is a broad and efficient training, leading to absolute proficiency in the technique and a thorough background knowledge of all the basic principles involved. The techniques adopted for CPR are sequential in nature. To be successful, it requires proper demonstration, continuous practice and frequent testing till the time that the performers master the technique and can initiate and proceed with CPR in the shortest possible time, as the time is often the deciding factor in the chances of success in such cases.

The time from cardiac arrest to start of CPR is crucial for the desirable outcome, as seen by the appearance of the symptoms,

Pulselessness	immediately
Unconsciousness	0 to 20 seconds
Dyspnoea, resp. arrest	10 to 30 seconds
Dilated, unresponsive pupils	60 to 90 seconds

If immediate CPR is not done, rapid clinical death ensues, which is distinguished by respiratory and cardiocirculatory arrest, and can be reversed within a short period of time with the restoration of all organ functions when effecitve methods of reanimation are instituted. If CPR is initiated when five to ten minutes have already elapsed, the chance of complete cerebral restitution is minimal, unless special conditions e.g. hypothermia or barbiturate poisoning are present. In the absence of CPR, biological death will quickly follow. Necrosis of neuronal tissue occurs in most cases after about five to ten minutes.

Only an experienced operator can be expected to react promptly and institute effective CPR in the shortest possible time. Training imparts necessary confidence as well as the skill to recognize the need and the will power to proceed with the CPR.

Further, only an experienced operator can deliver effective CPR. The exact number of ventilation's, chest compressions or their sequence is learned only by continual practice and drill. The amount of pressure exerted during cardiac compression is vital. Too much force can only lead to fracture of ribs, rupture of spleen or liver, or haemopneumothorax; whereas, too little force will fail to produce the desired pumping effect. Similarly an incorrectly performed Heimlich's maneuver can lead to rupture of abdominal viscera and/or aspiration following regurgitation etc. Large tidal ventilation may also lead to inflation of stomach and regurgitation; and low tidal volumes will not oxygenate the patient at all.

In real life, only trained performer will be able to deliver the effective CPR. Training on victims in real life emergencies is an insane idea. You require training models or manikins for this purpose.

These training models must have certain anatomical and physiological features of a normal adult, in order to give realistic conditions for the practicing and training of resuscitation measures. It should preferably have head, neck and thorax parts, which are actually required in CPR training. The form, contours and colour of the parts should be as life like as possible. The form of the face must allow common resuscitation techniques, i.e. mouth to mask, mouth to nose and mouth to mouth ventilation. The lower jaw and neck should allow maneuvers as realistically as possible.

The effectiveness of resuscitation is shown by clinical signs, which are difficult to simulate in a training model. The performance of resuscitative actions and their timing can be practiced without special monitoring; however, to get quantitative values for insufflation volume or depth of thorax compression, monitoring instruments will be required. The performer can assess precisely the effect of a correct performance and the consequence of an incorrect action. It can be concluded that the practical training can be considerably enhanced and classified with a monitoring instrument on the training model, as the correctness of the performance can be acknowledged and confirmed or corrected immediately. The step by step procedure is simpler to demonstrate for the instructor and easier for the trainee and the group to carry out afterwards. It is more expensive, but

correspondingly more instructional.

Computerized models are now available which guide the trainees through the whole sequence of CPR. These are able to record the performance of individual performers and grade them; show their weak areas and suggest remedial measures. These can be used for individual trainees or a small group of trainees.

Ambu is the world leader in training models and manikins. They have introduced a series of models, having diverse features and capabilities. These can be of immense help to train groups and teams of trainees in effective CPR at various levels. Needless to say this training should not be restricted to a particular group of paramedics. Medical students and nursing staff must be fully trained at institutional level during their academic training. Other classes of hospital staff e.g. general duty workers, drivers or alike must be trained at hospital level. Training sessions must be a regular feature in every hospital, and it has been recommended that an individual must have at least one training session every 3-4 months.

The CPR training requirement can not be overemphasized for any organization, other than armed forces medical personal. They have to participate in collection, resuscitation and evacuation of casualties not only during war, but also during peacetime natural calamities or man made disasters. To save life, every one employed on such duties must be a master of technique of CPR and training models or manikins provide an excellent opportunity for them to master.

The concerns regarding transmission of communicable disease through manikins has lead to development of some parts, which are disposable, e.g. the mouth piece, or polythane bags inflated during ventilations etc. Now the trainees can learn CPR without the fear of acquiring disease, for example, HIV or Hepatitis B or C.The mouthpiece is changed after every performance by a trainee.

A brief outline of various training models is summarized in the following paragraphs for the knowledge of our readers.

AMBU TRAINING MANIKINS

Ambu Man with ACD CPR

Ambu manikins simulate realistic and accurate anatomical features relevant for CPR. The patented hygienic system with its reusable face piece and disposable head bag provides safety and comfort for each student.

Ambu CPR Pal

Furthermore the manikins require no internal cleaning, minimizing, preparation time for instructors.

All Ambu training manikins are made of high-quality materials that ensure long product life.

AMBU MULTIMAN

Now the effectiveness of BLS training can be multiplied four fold, without multiplying costs. Ambu Multiman offers more realism, more convenience and more interactions between students. This unique manikin has the following features:

- 4 manikins in one for more hands-on training.
- Can be separated into 2 x 2 torso units.
- Easy transport and storage due to compact and lightweight concept

- Hygienic system, as the Ambu Man enables training on both manikins with one face piece/head bag.
- Look – Listen – Feel. Just as in real life, ventilation can be seen and exhalation through the nose and mouth can be felt and heard.
- Compression depth indication. A moveable band indicates correct compression by a green and incorrect depth of compression by a red band.
- Airways open only when head is correctly hyperextended.

AMBU CPR SOFTWARE KIT

The Ambu CPR software kit allows you to use all facilities offered by your Ambu manikin with a computer connection. It consists of an interface cable, including

an analogue digital converter (ADC) and Windows-based CPR software, enabling you to plan, monitor, record and print your training sessions with the computer and printer you already have.

FEATURES

To plan training sessions, the software comprises a course planner as well as a trainee database, allowing you to personalize and plan training sessions or a whole day's training.

During a training session or break you can evaluate the data transmitted on-screen. The software offers the possibility of modifying the displayed time interval (zoom in/out), to measure time intervals and compression/ventilation values. Furthermore, a comprehensive graphic and numerical test result table is available.

All information can be saved and printed, to document each individual training session.

AMBU BABY

Ambu Baby corresponds to a real baby up to one-year-old. It is the youngest member of the Ambu family

of training manikins. Teaching BLS with the Baby gives a very lifelike simulation.

CHILD BLS MANIKIN

The Child BLS Manikin is a low-cost, full body child manikin that completes full range of training manikins. It accurately simulates the anatomical features of the airways and the thorax of a child.

AMBU DEFIB TRAINER SYSTEM

The system is designed for practicing early defibrillation with AEDs, semi-automatic and manual defibrillators. Furthermore, mouth-to-mouth and mouth-to-barrier ventilation can be trained.

FEATURES

The manikin has the tried and tested mechanical monitoring instrument that gives you instant feedback on ventilation volume, stomach inflation, chest compression depth and wrong hand position.

Patented hygienic system, avoiding cross-infection and internal cleaning, and letting the manikin exhale though nose and mouth.

Chest rigidity adjustable so that different body builds can be simulated.

PC connection possible, so that Ambu CPR Software Kit can be connected.

Ambu ECG Box simulates as many as 26 rhythms and 2 artifacts, giving you a wide variety of ECG options.

AMBU CARDIAC CARE TRAINER SYSTEM

This system has been designed for hands-on cardiac training. The system can also be used as an Advanced Cardiac Life Support Trainer, where ACLS algorithms and teamwork can be trained indoors or on location in field situations.

FEATURES

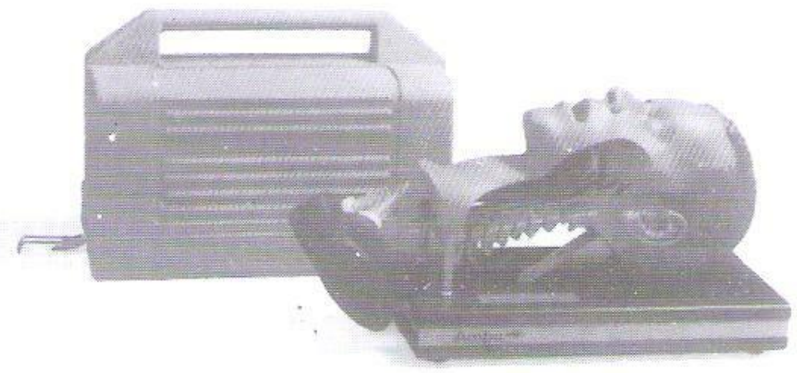
Intubation with ordinary oral tube, Laryngeal mask and Combitube, defibrillation, ECG lead diversion and IV training can be trained on the manikin making the training scenario realistic.

AMBU INTUBATION TRAINER

The Ambu Intubation Trainer is for teaching intubation techniques with laryngoscopes, airways, endotracheal tubes, LMA (Laryngeal Mask Airway), Combitube and other auxiliary aids for airway management.

FEATURES

Accurate simulation of mouth, nostrils, teeth, tongue, pharynx, larynx, epiglottis, vocal cords, trachea,



oesophagus and lungs, making it the most realistic intubation trainer available.

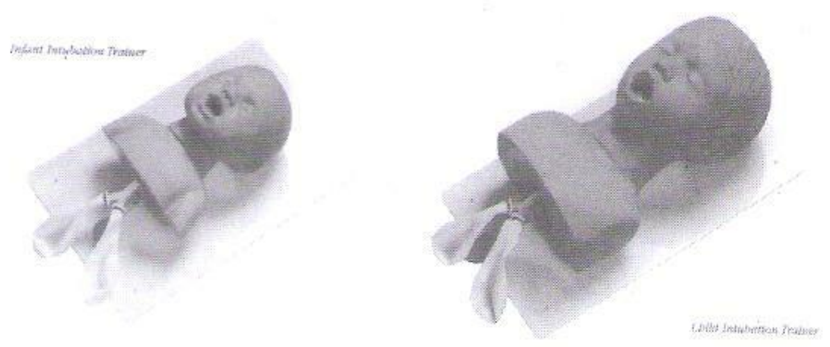
Realistic lifting and tilting of head gives you the right feel.

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, LMA



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.

Intubation difficulty can be adjusted so that different types can be simulated.

INFANT AND CHILD INTUBATION TRAINER

These intubation trainers allow you to train both infant and child intubations realistically.

FEATURES

Both trainers contain uvula, vocal cords, glottis, epiglottis, larynx, arytenoid cartilage, trachea, oesophagus, and inflatable lungs and stomach.

Both mounted on practical boards to make them steadier.

Vocal cords are highlighted in white for ease of laryngoscope viewing.

Infant and Child manikins can accept up to 2.5 and 4. 0 mm endotracheal tubing, respectively, for training with the size used in real life.

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REQUIREMENTS OF A TRAINING MODEL

Appearance

Head: nostrils, mouth, lower jaw

Throat; sharpe of larynx and muscles

Thorax; skeletal and muscular detail, costal arch

Functional features

Mobility of head; flexion, hyperextension, rotation, Airways: open or closed depending on head position, access via nose or mouth

Lung: capacity -2 to 3 times the tidal volume, compliance limited to approx, half the normal value.

Thorax: depth of compression at least 5 cm, variable compression resistance.

Monitoring instruments

Quantitative: ventilation volume, depth of compression

Qualitative: stomach insufflation, wrong point of compression

Recording and analysing system

Description of progress: ventilation and compression curves, stomach inflation, wrong point of compression.

Error analysis: exceeding or reaching limiting values, error frequency.

Hygienic requirements

No risk of cross-infection:

exchange and disinfection of face piece, exchangeable airways.