Simulation in Training

The backbone of all prehospital care is training. In addition to teaching didactic material and practical skills, training should include simulation to provide practice in realistic situations and to place that training in proper perspective Frank Dawson explores ways to use simulation to provide realistic practice

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by Frank M. Dawson

Are your simulations for real? Do they demonstrate the results of the mechanism of injury? Do they reflect what you are teaching or have taught? Are the minor details missing that give credibility? Do they allow for alternative treatment? Does the simulated patient understand the immediate and progressive effects of the injury? Do they teach a point?

The use of situation role playing in the training of EMT students should be on a progressive basis. As you go from dispatch information to the topics of evaluation and treatment — ABCs, hemorrhage, shock, fractures, soft tissue injury — each can be added as the class progresses. The interaction of one condition upon another can be demonstrated by making the injuries or medical complications as realistic as possible.

During the exercise you should evaluate leadership; completeness of IPS; correct treatment; communication to the patient, bystanders, other emergency personnel; and what the radio report should be. Watch for correct equipment handling and patient transport. Watch for sequential errors, i.e., checking fractures before assessing airway or bypassing a patient because he appears dead. After the exercise, immediate feedback of both positive and negative findings is imperative. Feedback reinforces learning and allows the instructor to correct errors immediately. It is often helpful to have an outside observer discuss what was noticed, because instructors often assume things were done because they presented them and, therefore, fail to observe the omission.

There are three schools of thought in choosing simulated patients. The first is using persons who have experienced the event to be shown. This gives the student feedback not only concerning injury or illness, but also the emotional aspects. The second uses students. This increases the student's knowledge of signs and symptoms, and helps to identify what the rescuer did correctly from what was omitted or done improperly. The third choice are actors who do excellent simulations and, when used more than once, provide excellent feedback for the student. Where money and time permits, videotape can be used to provide visual feedback for the student and class. Using videotape is also an excellent way for the instructor to identify what parts of the course require further emphasis.

Instruction to the simulated patient should be precise, indicating positioning and sequence of symptomatology. It should include type of response, i.e., alert, semicomatose or comatose. It is essential that the reaction to improper treatment be responded to, such as movement of the patient's head and neck by the rescuers prior to evaluation or before they determine what may have happened, causing signs of paralysis according to type of injury. Movement of broken bones also should elicit pain as should rough handling. In addition, the patient should react when rescuers discuss the problem within hearing distance, demonstrating anguish, apprehension or hostility.

When rescuers fail to introduce themselves and/or ask the model's name, the nonverbal signs of being uncooperative can be instituted, i.e., being noncommunicative, one syllable answers or withdrawing by body movements, especially when a rescuer wants to touch the model. Has the model been told where the rescuer is putting personal objects like glasses? Has the treatment procedure been adequately demonstrated and practiced beforehand? Are objects unnecessary to the scene removed? Does the safety of the res-

cuers and model always remain foremost in the instructor's mind?

The make-up of the role players and the situation should be accomplished in as realistic a setting as possible. When this cannot be provided, a written scenario should be given to the students with supplemental information as they are examining the model. This supplemental information can be of three kinds: a written slip, a word from the instructor or a change in the model condition, i.e., evidence of pain, change of breathing pattern, increased or decreased simulated blood flow, anxiety to belligerence or a change in the state of consciousness. When simulating injuries, they should be not only of the type that occur most often, but also the rare type that appears as a life-threatening or disabling injury for a given situation. When spinal cord injury is simulated, loss of sensation, flaccidity and abdominal breathing should be demonstrated by the patient. When there is only a vertebral fracture, then pain over the site, bruising and/or swelling should be evident. Torn clothing, foreign bodies and dirt or other items should be realistically presented. For example, if a model has a power saw accident, there should not only be blood and possibly dirt on his hands and clothing, but also sawdust with the dismembered part lying nearby. Where burns are simulated, evidence of the causative factor should be simulated with simple ready-made moulages. The secret of realism is how well everything blends together. Singed eyebrows may be simulated by cigarette ashes, make-up powder or a light coating of collodion. When simulating smoke inhalation, powdered charcoal in the mouth and nose give a clue, with streaks of sooty sweat using water or glycerin and charcoal or ashes. Glycerin mixed with yellow food coloring with or without a tinge of red is ideal for demonstrating cerebral fluid loss.

When simulating a burn injury, remember the cause. Care should be taken to illustrate not only that the model is burned, but also the causative factor. Burns caused by fire are generally dry, while grease creates a wet burn. Third degree burns are generally surrounded by a white demarcation, and have small droplets of blood indicating vascular damage. Steam burns are generally flesh- or very pale-colored with definite demarcation between healthy and dead tissue. Electrical burns have an entrance and exit point relating to the flow of electricity. The entrance site will generally present as a small, blackened spider web area with some white, unless the amperage is extremely high. Then there will be a searing effect at the entrance site and the model will be in respiratory arrest, and often cardiac arrest. Ensure that there are simulated down lines at the site or some device that will trigger the thought of electrical injury, especially if the exercise is totally unrehearsed.

Impalements can be simulated with plastic bits and pieces. Colored plastic makes them easier to find in dim light. Lead pellets or iron can be used to demonstrate gunshot wounds or blown boilers. For large impalements, wood or plastic foam strapped in place may be used.

Plastic Wood makes ideal abrasions and floor burns. Mortician's wax, Play Dough, foamy soap (spray), and mixtures of flour and water can be used to make wounds, as can liquid latex. Sprayed pink frosting can be used for blood in the mouth or for sucking chest wounds. The use of theatrical make-up is excellent for shock, and attention to skin tone here is important. In the black person a color called "sallow-old-man" creates a minimal shock effect. Glycerin and water can be used for tears and sweat, lipstick for wound lining, eye shadow for bruises. To differentiate between an old bruise and a new one, use yellow stippling for the old and blue stippling for the new bruise.

In creating a hypothermic effect, use a combination of grey, white and blue make-up, comparing your skin color with the model. The deeper the hypothermia, the greater the difference in skin color should be between you and the model. Remember, all exposed parts must be made up. If wrinkling is desired, use collodion or Newskin.

Other Simulated Materials

Vomitus can be made from gruel, a loose mixture of oatmeal mixed with green and yellow food coloring to indicate bile and stomach contents. Black coffee can be used to indicate old blood and red frosting to indicate fresh blood. Egg whites can

Photo courtesy of Simulaids

be used as mucus with sweetener added to make it palatable.

Fractures may be created with any kind of buildup material using chicken or animal bones. Plastic tubing can be used to simulate veins, arteries and nerves. A slight yellow tint can be used to color the nerves while light or dark red can be used for the blood and blood vessels. To give an impression of depth, the wounds should be lined with dark red and lightened as you come to the surface. Collodion can be used to make scars and to simulate small cuts. Alka-Seltzer can be added to blood to spontaneously simulate sucking chest wounds or frothy bleeding from the mouth.

Styrofoam used in injury simulations makes excellent dismembered parts. The crinkle approximates crepitus as do cellophane wrappers from cigarette packs. Cellophane wrapping can also be used to demonstrate fremitus. Foam rubber under wigs is often used to simulate a spongy skull. To cover a head of hair, a skull cap can be used by placing moulage materials underneath. Either sponginess or depressed fractures can be simulated. A wig placed over the skull cap then gives a sense of realism. Sponges can be used to create an impression of jaw displacement, while buildup with putty will do the same for a nasal fracture.

To provide training in caring for the physically handicapped or non-English-speaking patients, several approaches can be taken. With the deaf, have the model wear ear plugs to prevent inadvertent response. Cards in the pocket stating the disability are helpful. For the blind, use blinders on the patient covered with sunglasses to preserve the anxiety and uncertainty of the model. In teaching nonverbal communication, the scene must be realistically designed. Have students or models who speak a foreign language act as the patient because this presents a completely different aspect of patient care, creating not only communication problems but also cultural problems.

As in all role playing and simulations, moulaging has its cautions. Ensure that the simulated patient is not allergic to make-up. If there is a chance for injury, such as in lifting and moving, ensure that the models are properly secured and lifted. Caution students concerning existing hazards. Also, have the proper people been informed that an exercise is taking place outside the classroom? Having the law arrive with drawn guns can be traumatic, or having an ambulance called when it is just a drill can be embarrassing. If using Duco-cement, keep it away from the face. Have the students been informed not to step over the model's face? Do not use irritating materials on the skin. Also, be careful to use only solutions that do not stain clothing. In using make-up, put on a base coat of cold cream so it is easy to remove. Retrieve all medic alert simulation tags.

To preserve good simulations, take Polaroids or videotapes of them. Write down the directions for make-up and scene requirements, include instructions to the simulated patient and the student and the evaluation sheet for the observer. □