
Traumatic Injuries in Children

A Home study

Course

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Course Objectives:

Upon completion the Student will be able to:

1. Demonstrate an understanding of the incidence of traumatic injuries to children in the United States.
2. Identify the common causes of traumatic injuries to children.
3. Identify the steps to stabilization of the child while in the field and in the Emergency department.
4. Demonstrate an understanding of the Role(s) of the nurse as a member of the trauma team.
5. Demonstrate an understanding of the emotional needs of the child and the family during and following the crisis of traumatic injury.
6. Demonstrate an understanding of the care of children who have the following traumatic injuries:

Head and Neuro
Musculoskeletal
Chest Trauma
Abdominal
Burns

7. Identify the appropriate approaches for the child in pain.
8. Identify the signs of shock in the child.
9. Demonstrate an understanding of the indicators of child abuse.
10. Describe the importance of referral for rehabilitation.

Introduction

Traumatic injury is a common reason for a child to be admitted to an Emergency Department and/or to an Intensive Care Unit. Pediatric injuries account for approximately One Million admission to hospitals and for over 25 Million Emergency Department visits each year (Micik and Walker, 1987). All members of the team, including pre-hospital team members, need to be highly skilled in treating the child with a traumatic injury. Unlike adults who possibly have health problems prior to the injury, the child is usually in good health prior to the trauma. Because of this, a main focus (after immediate treatment) should be on returning the child (and the family) to as normal a lifestyle as possible.

The leading cause of death in the child between the ages of one and fourteen (22,000 to 25,000 children/year) is traumatic injury (Baker and Waller, 1989). Additionally, the disabilities resulting from multisystem trauma are not only tragedies for the child and family, but also for society. The long term cost to society of providing care for the child and resources to the family is one concern, but it is virtually impossible to measure the cost of the loss to society of the child's talents and potential. Many of the injuries to children are preventable.

Studies have shown that there is an increase in accidental injuries and in poisonings in children during a period of family crisis (Scheidt). If the family is already in a time of crisis, and then a traumatic event occurs with one of the children, the crisis is worsened. There may also be tremendous guilt attached to the event by one or both parents. In addition to meeting the child's immediate physical needs, skillful family crisis intervention will need to be provided.

The Emergency Medical System that was developed in this country is being expanded by developing a system within a system in order to better care for injured children. It is estimated that one out of every five children in the United States is cared for in an Emergency Department each year for an accidental injury. A total of 100,000 children suffer permanent disability and 8,500 children less than 14 years of age die each year from accidental injuries (Behrman, 1992).

Four areas lead the locations for accidental injuries to children. They are: the streets, the home, schools, and on the farm. Motor vehicular accidents (MVA) primarily affect two groups: teenager and infants. One out of every fifty teenagers is injured in a Motor Vehicular Accident each year. The use of alcohol is a factor in 50% of these accidents. Ten percent of the drivers are under 20 years of age, but account for 18% of automobile fatalities.

Infants also have a particularly high injury rate (9.1/1,000,000/yr). The infant being transported on the lap of an adult in the front seat is at highest risk because of the velocity of the infant's body plus the crushing which occurs from the adult behind the infant (Behrman, 1992). Since accidents most often occur without any prior warning, it is always best to have the infant restrained in an acceptable infant seat. Other types of motor vehicular accidents involving children are bicycles, motorcycles, mopeds, motorbikes, and motor scooters. Many accidents involving a bicycle or motorcycle also involve another vehicle. It is estimated that one out of every eighty children between the ages of 6 – 12 are treated in a hospital every year for an injury from a bicycle accident.

Many (70%) bicycle accidents involving young children seemed to occur when they were in violation of traffic laws. They were frequently cited for such infractions as turning violations, riding facing traffic and failure to yield the right of way. One has to ask whether children are being taught the proper way to ride the bicycle or if they are just unable to adjust quickly enough to rapidly changing traffic conditions. About sixty percent of the fatalities from pedestrian vs. motor vehicle accidents each year involve a person less than 24 years of age. Children involved in these accidents are usually unsupervised at the time of the accident and they usually dash out into traffic, often from behind an object which blocks them from the view of the unsuspecting motorist.

The most common type of accident occurring in the home occurs in the two to three year old. These accidents are usually falls from various heights, either down stairs or against furniture or other objects. The distance of the fall seems to be less important than the surface against which the child falls. An unusually high number of children using walkers (one out of three) are injured, often from a fall down stairs. Parents and caretakers need to "child-proof" their homes periodically to keep safety hazards for small children under control. Parents also need to be aware of toy safety issues since this is another potential cause of childhood accidental injuries. A toy purchased for an older sibling can be fatal if a younger brother or sister plays with it.

Physical Education activities at school are one of the leading causes of injuries occurring at schools. Younger children are often injured in unorganized activities. Shop and interscholastic sports activities are also involved in the accidents related to older children. Thirty percent of the injuries happen to teenage males. The surfaces upon which the activities are conducted play an important part of the severity of the

injury. This also includes the surfaces over which playground equipment is installed. Any surface which is energy-absorbing is better than a surface such as asphalt or even hard-packed dirt.

The injury level for sports activities is significant. One out of every fourteen teenagers is treated in a hospital every year for a sports related injury; most of which occur during practice, instead of during the actual competition. The farm is also the scene of a significant number of injuries (20,000+) to children each year; most of which occur during planting and harvest times (Behrman, 1992).

While the types of accidents that happen to a child are related to their developmental level, they also seem to be related to the amount of adult supervision provided for the child. As parents have increasingly busy schedules, they must be aware of the need to provide for the supervision and safety of their children and make the necessary provision.

Nurses must be aware of the development of the child as well as the developmental needs. The physical development and age of the child has a bearing on what type of injury the child will have and the developmental needs will directly affect the care needed. As an example, the toddler struck by the bumper of a car may sustain head and chest injuries, while a six year old struck by the same bumper may have lower leg injuries. The toddler may need a parent at the bedside all of the time, while the six year old is verbal and may not need a parent all of the time.

Children are Different from Adults:

When judging the severity of specific injuries in a specific child, and in planning definitive treatment, consideration needs to be given to obvious injuries, but also to the following:

1. In the child, blunt injury is more frequent than penetrating injury. Because of the smallness of the space, the injury has a greater potential of being more severe. In the adult, the blunt injury is spread over more space, thus dissipating the force of the injury. In the child, it is more concentrated, thus often much more severe.
2. Head injuries in the child are frequent, partly because the child becomes a projectile in an accident, hurling through the air, with the head being at the front of the projectile. The severity of the injury has to do with the force plus the type of surface against which the child impacts. The head injury in a child is usually more diffuse than in the adult. In addition, subdural, intracranial and epidural bleeding is less common in the child than in the adult.

Children who do survive a head injury usually recover more fully than the adult who sustains the same head injury (Tepas, 1990). Seizures after a head injury are more likely to occur in the child than in the adult. These can occur immediately or up to 48 hours after the injury. The use of the Glasgow Coma Scale is prevalent in Trauma Centers as a means of assessing mental status of the injured person. This Scale is effective for adults, but it does not account for the developmental differences in young children. A modified Glasgow Coma Scale has been developed for the preverbal child or the child who is not easily following directions (Patterson, 1992).

3. Spinal cord injuries in children amount to about five percent of all spinal cord injuries. This is largely due to the greater elasticity of the child's spine. Children are less apt to have vertebral fractures than the adult, unless severe stress is put on the spine of the child. Other bone structure is also less likely to fracture because the bones are more compliant than those of an adult.
4. The abdominal wall in children is less well developed in children than in adults; therefore, injuries to the abdomen can be very severe. Vital organs are closer to the surface, so the child can more easily have internal injuries.

5. Additionally, because children have smaller airways they are more likely to go into respiratory distress. One of the primary causes of death in children suffering trauma is airway compromise. Children also have a proportionately larger head than adults and this makes positioning for needed procedures difficult (Reynolds, 1992). Intubation is more difficult in the young child because of the angle and location of the larynx. Intubation should be tried by only experienced staff and should be done prior to transport if continued bag-mask ventilation is not going to be possible. Any interference which prevents diaphragm excursion in the child will impede the ventilator effort of the child because the intercostal muscles are not capable of elevating the chest wall to allow inspiration. The child must depend upon the diaphragm to initiate inspiration. Any interference may result in respiratory failure (Hazinski, 1992).
6. Blood pressure cannot be used as the only criteria for estimating blood loss. Blood pressure can be maintained in children until 25 to 50% of their blood volume has been lost. A slight increase in the **diastolic** pressure is usually an indication of impending shock in a pediatric patient. Pulse rate will be rising in the child before the **systolic** blood pressure drops. It is better to assess the circulatory effort by taking peripheral pulse rates, assessing for quality and strength as well as accurately counting the pulse rate. Other signs to monitor for are: capillary refill, skin color and temperature, urine output and EKG monitoring (Kitt and Kaiser, 1990). A child has little reserve cardiac output because the child's cardiac output and heart rate are near their maximum even when the child is at rest. So if the child has increased oxygen needs or the delivery of the oxygen is compromise, the child's condition may go downhill very quickly. The absence of cyanosis is not a reliable indicator of the child's oxygen saturation level. A child can be circulating a significant amount of deoxygenated hemoglobin without showing any signs of cyanosis. A child's anxiety level may cause irregularities in pulse and respiratory rates. It is important to count for one full minute when taking these vital signs to achieve the most accurate information in addition to attempting to alleviate the child's anxiety.
7. Body temperature must be closely watched in the injured child. Hypothermia will hamper resuscitative efforts. Children lose more heat more quickly than adults because of their larger amount of surface area to volume ratio than adults. Warm blankets, warming lights and warmed intravenous fluids should be used as much as possible. The goal of re-warming should be about one degree centigrade per hour.
8. Fluid administration and urinary output must be carefully measured and calculated. After vascular access is established, fluids must be administered very carefully. The child will receive smaller amounts than the adult and excess fluid administration needs to be avoided. An accurate recording of all output is also necessary. Care should be taken to weigh diapers, pads, etc., to determine accurate output. Urine output drops when more than 25% of the total blood volume is lost. Keeping all of the above in mind, the earlier the child can be definitively treated, the better his/her potential outcome. The first **half hour** is considered to be a critical time period in the treatment of pediatric trauma patients (Kitt and Kaiser, 1990).

CARE OF THE PEDIATRIC TRAUMA VICTIM "IN THE FIELD":

When field personnel respond to the scene where there is a pediatric victim, one of their prime considerations needs to be to prevent or reverse any effects of hypoxia, since hypoxia is the usual pathway to death; although the specific cause may differ. The children who die most immediately after a traumatic injury die from one of the following conditions: airway compromise or respiratory arrest; hemorrhagic shock; or neurological injury. The field personnel must prioritize their care to begin with the assessment and stabilization of life-threatening injuries. This begins with an assessment of the **A**irway, **B**reathing and **C**irculation (including hemorrhage control) while making sure that the cervical spine is stabilized. The child is also assessed for **D**isability and level of consciousness, and **E**xposure. As this is occurring, the field team is gathering information to assist in the triage decisions about stabilization, resources and transport. This information includes specifics as to mechanism of injury, location of injuries and the over-all condition of the patient and any past medical history (Hazinski, 1992). The triage

decision also has to include where the victim is (what type of terrain, accessibility), what hospital facilities are available at that time and what methods of transportation are available. Usually guidelines are quite specific as to where patients have to be transported given their condition and location. These guidelines will have been developed within an area based upon resources available and with the greatest positive outcome for the patient as the priority. To assist the field personnel and hospital staff in their decision making, several tools have been devised to cause decision making to be more objective and consistent. An additional goal is to have the patient treated at the most appropriate facility to assure high quality patient care and the most positive patient care outcomes. These tools are scoring systems which assist in determining the severity of the injuries sustained and in predicting patient outcome. The tools are only as good as the people using them and all personnel need to be carefully trained in their use, both in scoring and in interpreting the data. These tools have evolved and will continue to improve as trauma care is refined. Some of the original scales used for adults have now been modified for use with children. Two are included in this paper for reference (Table 1 and Table 2).

The specific hospital and Emergency Medical System in which the nurse is working will decide which form will be used in that system. It is imperative that personnel completing the forms do so as accurately as possible. Patient care depends upon their accuracy; but research about trauma and decisions about emergency response systems also may be based upon the data from those initial scoring scales.

PEDIATRIC-MOFIFIED GLASCOW COMA SCALE

Eyes opening

Score	> 1 Year	< 1 Year
4	Spontaneously	Spontaneously
3	To verbal command	To shout
2	To pain	To pain
1	No response	No response

Best motor response

6	Obeys	Spontaneous
5	Localizes pain	Localizes pain
4	Flexion-withdrawal	Flexion-withdrawal
3	Flexion-abnormal (decorticate)	Flexion-abnormal (decorticate)
2	Extension (decerebrate)	Extension (decerebrate)
1	No response	No response

Best verbal response

Score	>5 Years	2-5 Years	Birth-23 Months
5	Oriented and converses	Appropriate words & phrases	Smiles, coos, appropriately
4	Disoriented & converses	Inappropriate words	Cries; consolable
3	Inappropriate words	Persistent cries or screams	Persistent, inappropriate crying and/or screaming
2	Incomprehensive sounds	Grunts	Grunts; agitated/restless
1	No response	No response	No response

Note: From Severe Head Trauma (p.5) by J. Simon, 1988. Presented at Pediatric Emergencies, Williamsburg: Resource Applications

Component	Severity Category		
	+2	+1	-1
Size	>20 Kg	10-20 Kg	<10 Kg
Airway	Normal	Maintainable	Unmaintainable
CNS	Awake	Obtunded	Comatose
Systolic BP	>90 mm Hg	90-50 mm Hg	<50 mm Hg
Open wounds	None	Closed fracture	Open/multiple fractures
Cutaneous	None	Minor	Major/penetrating

Total (points) _____

Neff, Janet and Pamela Kidd. *Trauma Nursing, The Art and Science*. Mosby, 1993, pages 541-542.

CARE OF THE TRAUMATICALLY INJURED CHILD IN THE EMERGENCY DEPARTMENT OR TRAUMA CENTER:

One of the benefits in participating as part of a trauma system is the organization of the care that is delivered to the patient. When the patient enters the Trauma Room (whether it is located in the Emergency Department or elsewhere), the Trauma Team begins to function as a team to provide care. Each team member is assigned to a list of duties which he/she initiates as soon as the patient arrives. There is no waiting until someone tells a team member what to do. The assignment to the specific role delineates their priorities. The team functions as one unit in providing care. The confusion in the room is minimized and patient care happens in a much smoother manner than when one person is assessing and identifying all of the needs for treatment.

Delineation of role responsibilities will differ by institution and make-up of the Trauma Team. The members of the Trauma Team include: The physician team leader (often a Trauma Surgeon), an Emergency Physician and/or Anesthesiologist (these may be interns and/or residents in a teaching facility), one or two nurses, respiratory therapist and a person to document. Either the Anesthesiologist or the Emergency Physician will assume responsibility to assess and manage the patient's airway and respiratory status. This role will assess what procedures have already been implemented and will institute any additional ones necessary. These procedures may include intubation, applying dressings to head wounds, inserting a nasogastric tube and determining the need for ventilator use (including helping to set up the ventilator). This role also assesses neuro status of the head and cervical spine. The respiratory therapist and one of the nurses (as necessary) will assist this person.

The Physician Team Leader will do the over-all assessment of the patient, evaluating procedures already implemented and will perform any needed critical procedures (insert chest tubes, put in a central line, etc.). The nurse role will usually be assigned such procedures as putting on the cardiac monitor, obtaining vital signs, inserting an indwelling catheter, setting up a heat source as needed, applying pressure dressings, additional assessment for injuries, the administration of fluids/blood products, etc.

Other professionals who will usually be designated to respond to the Trauma Resuscitation area are a Laboratory Technician, a Radiology Technician, and in some facilities, a Pharmacist. Systematizing is implemented more easily if protocols are predetermined for X-rays and for Laboratory Tests that will be ordered. Time should not be used during the resuscitation to determine anything that could be determined ahead of time. Of course, there will always be individual patient care decisions which will need to be made by the Physician Team Leader, but the more that can be systematized, the better. The less the Team has to think about routine issues, the better able they are to deal effectively with the individual needs of the patient.

The other essential member of the Team is an individual who is assigned to document all that transpires in the resuscitation of the patient. This individual does not need to be a nurse, but does need to have some specific training for the role of "scribe". Some Trauma Centers have very effectively used unit secretaries or nurse assistants to fulfill this role.

When a child is the trauma victim it is of utmost importance that the child be transported to the Trauma Center designated, equipped and staffed for children. A multidisciplinary group was formed under the auspices of the American Academy of Pediatrics and has published recommendations relating to pediatric transport systems (Day, et al., 1991). Hart and others (1987) have outlined recommendations for transport of the pediatric trauma patient which speak to specific patient conditions.

These recommendations include:

- ✓ Serious injury to one or more organ system
- ✓ Hypovolemic shock requiring more than one transfusion
- ✓ Significant orthopedic injuries
- ✓ Spinal cord injuries
- ✓ Blunt abdominal injury with hemodynamic instability
- ✓ The need for ventilator support
- ✓ Extremity re-implantation
- ✓ Deteriorating neurological status, increased ICP, altered mental status, head injuries with cerebral spinal fluid leak
- ✓ Burns involving more than 15% TBSA
- ✓ Falls from heights
- ✓ Motor vehicle crashes involving associated fatalities, extrication longer than 15 minutes, speeds more than 55 mph, and pedestrians who have been struck
- ✓ Trauma score less than 9

The physician makes the final determination regarding transfer and guidelines will be specific to a particular emergency medical response system.

The injured child must be stabilized prior to transport. Family members need to be told about the transport and should be allowed to see the child before transport (Neff and Kidd, 1992). The Social Worker who is part of many Trauma Teams will usually handle these details, but if the system in which the nurse is working does not provide a Social Worker, this responsibility will often become the nurse's role. The Social Worker will also be a key factor in assisting the family to cope with the crisis involved with the traumatic situation. In a child abuse situation, the Social worker adds an important role as an assessor of the individual and family interactions. Evaluating family dynamics is an art of this professional role.

As the patient arrives in the Trauma Room and the trauma team begins working, the first priority of one of the team members is to assess the airway and make certain that provision has been made for adequate ventilation. This has to be accomplished while cervical immobility is maintained. The usual way of opening the airway is to do a chin lift or jaw thrust to avoid any manipulation of the head until cervical spine injuries have been ruled out. Spine immobilization should be done in the field and not removed until the spinal x-ray films are judged to be negative. If a lap belt injury is suspected, then the lumbar area should also be immobilized. The airway needs to be checked to make sure that no obstructive items such as food, blood, mucous, etc. are present. Suctioning can easily remove such obstructions.

A crushing airway obstruction will usually require intubation and surgical intervention. Stabilization needs to be completed before the patient has to undergo diagnostic studies such as a CAT scan. If an airway is not sufficient, then intubation is necessary and should be performed by someone skilled in pediatric intubation. The tube placement must be verified by X-ray and then need to be securely taped. Throughout the stages of resuscitation, proper airway management must be provided. Oxygen should be administered by face mask at 10 L/min or by nasal cannula at 6 L/min. Be sure that the face mask chosen is of the appropriate size for the patient. In the alert child, oxygen administration by mask may be very

upsetting. Most children do not like having something placed on their face. It may be helpful for the nurse to hold the mask up to the face so that oxygen is still delivered, but the child does not feel as if it is covering his/her face. This may also be a good task for a parent to do. Because the child uses the abdominal muscles for breathing and because children swallow air more so than adults, a nasogastric tube is often inserted to decompress the abdomen as an aid to easier breathing and as a way to prevent aspiration. The nurse must observe the child for any signs of airway obstruction.

The signs of airway obstruction are:

1. Stridor
2. Wheezing
3. Increased respiratory effort (watch for suprasternal or supraclavicular retractions)
4. Nasal flaring
5. Weak cry
6. Tachypnea

LATE SIGNS ARE:

1. Bradycardia
2. Decreased air movement
3. Hypoxemia or hypercarbia
4. Slowed respiratory rate (Hazinski, 1992)

If respiratory efforts are not adequate, then positive pressure ventilation must be considered and initiated before deterioration occurs.

There are some traumatic thoracic injuries which will result in respiratory failure if not treated in a timely manner. They are:

1. Tension pneumothorax
2. Open pneumothorax
3. Massive hemothorax
4. Pericardial tamponade
5. Flail chest

Fortunately, penetrating trauma in children is not very common (O'Neill, 1989).

Once the airway and circulation are properly evaluated and appropriate interventions are in place, a secondary assessment must be done on the patient. Two goals are to be accomplished by the secondary assessment. One is to evaluate the trauma victim's response to the initial resuscitation efforts. The second is to identify any other injuries, systemically examining all systems and parts of the body. It is best to do a head-to-toe assessment to ensure that no injuries are overlooked and to prevent any deterioration in the patient's condition.

HEAD

The most common head injury in children is closed head injury (Seidel and Henderson, 1987). Head trauma is the most common pediatric trauma seen in the Emergency Department. There are about 500,000 head injuries in children each year. It is estimated that about 25,000 of these children will either die or be permanently disabled due to the head injury. About 15% of pediatric patients with a head injury will require surgical intervention (Eichelberger and Pratsch, 1988). The head should be carefully examined for any lacerations. The nose and ears should be checked for any drainage. If clear drainage is present, it should be tested for glucose. If it is positive for glucose, it may indicate that the fluid is cerebrospinal fluid. The nurse should assess the patient's mental status, sensation, response to pain, and movement on a regular basis. The patient should be asked to follow simple commands. Any deterioration in the patient's neurological status should be reported immediately. Head injuries in children are classified into three

categories: minor, moderate, and severe. Minor head injuries include scalp lacerations and concussions with a transient loss of consciousness. The Modified Glasgow Coma Scale allows for this category to include the young child who is crying and cannot be soothed enough to stop crying as well as the older child who is combative. These children will usually be admitted and have a CAT scan done to determine specific injuries. Severe head injury is said to be present when the Modified Glasgow Coma Score is less than 8. The primary objective then is to obtain a rapid evaluation using the CAT scan and to prevent increased intracranial pressure (Neff and Kidd, 1993).

NECK AND SPINE

The incidence of cervical spinal injury is about 2 to 3%, but the child's cervical area should always be protected until a cervical injury has been ruled out (Marcus, 1986). In order to fully evaluate the cervical and thoracic spine areas, a complete spine series will usually be done. A CAT scan may be utilized in the more unstable patient. The unstable patient will usually not undergo a MRI because of the difficulty in providing resuscitative measures should they be needed. If the mechanism of injury (i.e., lap belt) indicates the need, lumbar and sacral spine series will also be completed.

THORACIC

Rib fractures are not common in children because their rib cage is more pliable than the adult. Observations need to be made regarding breath sounds, chest asymmetry, difficult breathing and indications of pulmonary edema. Chest x-rays and CAT scan should be done if the child has an injury to the chest. If the child has suffered blunt trauma to the chest, there is an increased possibility of cardiac contusions so a 12 lead EKG and cardiac monitoring are usually ordered.

ABDOMINAL

The pediatric trauma victim with an abdominal injury usually has a blunt injury. The nurse must monitor the child frequently and be skilled at detecting subtle changes in vital signs and pain which may indicate hemorrhage and impending shock. If it is suspected that there is splenic, hepatic, or renal injuries, a CT scan with double contrast will be needed for proper visualization of the organs. Conservative management includes monitoring and caring for the child in an intensive care unit. Surgical intervention is also a possibility if the patient continues to bleed. When surgery is necessary, the attempt is to try to repair the injured organ instead of removing it.

GENITOURINARY

These injuries are not likely to be life-threatening, but trauma team members need to remember that children are more susceptible to renal injury because the kidneys are less protected in the child than in the adult. Hematuria, flank hematomas and abdominal pain, are signs of renal injury (West, et al, 1985). In addition, the nurse needs to be especially aware to look for any sign of blood in the urinary meatus before inserting the foley catheter. Blood being present is a contraindication to the insertion of the foley catheter. In the stable pediatric trauma patient, it may be advisable to wait until the child voids before determining to catheterize. The presence of any meatal blood is an indication for radiological procedures such as an IVP and/or CAT scan. A pediatric urological consultant may also be called in to evaluate the patient.

MUSCULOSKELETAL

Management of injuries to the musculoskeletal system is usually started after the initial management of the critical traumatic period unless there is significant blood loss from the injured portion. The vascular long bones such as the femur can be of major significance in the child because of the potential for blood loss. Pelvic fractures can also cause significant blood loss. The trauma nurse needs to do the evaluation for musculoskeletal injuries keeping in mind the developmental level of the child and the injuries that most frequently go with that specific age child. The nurse and physician always need to keep in mind the

possibility of child abuse. A careful history about the mechanism of injury needs to be taken, from parents as well as the child.

In evaluating the musculoskeletal injury, the nurse needs to observe the following: The presence and quality of pulses, loss of motion, absent or diminished capillary refill, swelling, color changes, pallor, coolness, any open wounds, protrusion of bones, deformities, pain/tenderness, bleeding and decreased sensation. Any deviations from normal need to be documented and brought to the attention of the physician team leader.

If a pelvic fracture is suspected, the Trauma Team will want to take steps to ensure that pelvic structures are intact and will want to evaluate closely for blood loss and replace as needed. There are six types of musculoskeletal trauma. They are:

1. **CONTUSION**: A bruise with bleeding into the soft tissues. These can occur anywhere in the body. Usually caused by a fall or blow directly to that area. The force of the blow causes capillary rupture, allowing blood to go into the subcutaneous and/or muscular tissue. This area becomes discolored and may be painful especially if the bleeding is into muscle tissue. The discoloration usually resolves in seven to ten days.
2. **STRAIN**: A strain results from an excessive stretching of the muscle beyond its capacity. This causes bleeding into the tissues and is painful and often swollen. Strains in a trauma situation would be acute, but strains can also be caused by chronic overuse. Strains are classified into three categories, according to their severity level. A level three strain may need surgical intervention.
3. **SPRAIN**: A sprain is an injury in the tendon or ligament around or in a joint, resulting in tearing of the fibers from their attachments. If a complete separation occurs, surgical intervention will be required. Sprains are also classified into three categories, according to the severity of the tear.
4. **SUBLUXATION**: A subluxation is an injury in which one of the bones is partially dislocated from the joint. It is caused by direct force or by a sideways force against one or both bones. Pain, swelling, and tenderness are part of this type of injury.
5. **DISLOCATION**: A dislocation is the complete separation of a bone from its joint. This is caused by a force pushing the bone from its joint. There is usually pain and altered function of the extremity. Bleeding and edema are usually mild.
6. **FRACTURE**: A fracture is a partial or complete break in a bone. Fractures usually are accompanied by pain, swelling, coolness of the site and functional changes. Specific documentation of coolness and description of the injury site is necessary (Mourad, 1991).

BURNS

Burns are a leading cause of accidental death in children between ages one and fourteen (East, et al, 1988). Approximately 745,000 children are burned yearly, with about 40% requiring hospitalization (Herdon, et al). The number of serious disabilities out-numbers the number of deaths. Many burns are preventable.

One of the key factors the Trauma Nurse should remember is that the child with a significant burn loses a large amount of fluid from the burn area itself. Fluid volume replacement in these children is crucial. Venous assessment is vital in order to adequately meet the fluid resuscitation requirements. These children also may lose heat rapidly so a warming source needs to be available. Pain relief may be an issue depending upon the severity and depth of the burn. It is highly likely that the Trauma Nurse may only see these children for a short period of time since they will likely be transferred to the Burn Center as soon as possible.

The skin is the largest organ in the body, comprised of three layers. The layers are (1) the epidermis, (2) the dermis and (3) the subcutaneous tissue. The epidermis regenerates continually and after a superficial burn, it will re-grow naturally. The dermis is thicker than the epidermis and actually makes up the major portion of the skin. It is this portion that contains the blood vessels, nerve endings, sweat and sebaceous glands, hair follicles and lymph spaces. When the dermis is burned, the skin cannot re-grow because all of the epithelial elements have been destroyed. The subcutaneous tissue contains adipose tissue and collagen. When this layer is burned, bones, tendons, and muscles may be exposed.

The functions of the skin have significant importance to the nurse caring for the burn patient. The functions include: thermoregulation, fluid and electrolyte balance, a protective barrier (the first line of defense against infection). These functions are all compromised when a child is burned. The severity of the burn injury is determined by the amount of skin burned and by the depth of the burn. Since the skin has different thicknesses in different parts of the body and the agent causing the burn may be in contact for varying amounts of time, the severity of the burns will differ in different locations.

A superficial burn (called a first degree burn) involves only the epidermis. When the burn involves the epidermis and extends into the dermis, it is called a partial thickness injury or a second degree burn. A full thickness or third degree burn includes the entire epidermis and dermis layers. The wound surface will be dry, leathery and with a waxy-white or black color produced by the destroyed dermis tissue. The patient with third degree burns experiences little or no pain because nerve endings have been destroyed. Fourth degree burns extend beyond the subcutaneous tissue into muscle and bone.

In children, the majority of deaths related to fires are due to smoke inhalation, so a major factor for the Trauma Nurse to focus on during the resuscitation phase is the child's respiratory condition. As soon as the seriously burned child is stable, he/she will be transferred to either a burn center or to a Pediatric Intensive Care Unit.

CHILD ABUSE

Child abuse is a term that is used to describe any mistreatment of children. It can include physical, emotional or sexual abuse. The definition has been broadened to include neglect of children as well as sexual exploitation.

Unfortunately, the persons most likely to commit child abuse are the parents of a child. Child abuse is not just a one-time incident, but actually is a pattern of maladjusted behavior. Steele (1987) has identified a three component syndrome that includes the maladjusted adult, the vulnerable child and the presence of situational stressors. It has been well documented that the usual adult abuser was abused as a child, both physically and emotionally. This child grows into a maladjusted adult, usually with feelings of inferiority, depression and problems with his/her own identity.

Because of the abuse during childhood, the child will not learn loving, supportive behavior during childhood, so will not be able to demonstrate such as an adult. Because the adult did not experience affectionate behavior and empathy as a child, he/she cannot even realize that the child with whom he/she is interacting needs affection and empathy. Additionally, the adult often has unrealistically high expectations and may punish the child if the child does not live up to the expectations (Steele, 1987). The nurse has some unique opportunities to observe and be alerted to the potential for an abusive situation to develop. As a newborn, the nurse can observe the bonding or lack of bonding between the child and parents. This observation can be made in either the Birthing Center or in the Out-Patient setting if the newborn needs to return for care (often additional blood tests are needed). The nurse needs to observe for interaction between the parent(s) and the newborn. Parent(s) may carry out parenting tasks without any interaction with the child. Premature and/or chronically ill children may be abused because the parents become frustrated and angry with a situation where the child is not responding to them as they think the child should respond. It is possible for physical child abuse to occur all of a child's life, but it is more likely to occur on a periodic, episodic basis. The abuse happens as a result of stressors in the life of the adult. The adult expects the child to meet his/her needs and when the child doesn't, the abuse occurs.

The child feels it is he/her fault and will often tell the inquirer that he/she was bad and that is why the beating occurred.

About ten percent of all the children less than five years of age seen in the Emergency Department with a traumatic injury are the victim of physical child abuse (Schmitt, 1987). Health care workers are required to report suspected cases of child abuse to the child protective agency in their area (Carroll and Haase, 1987). There are several flags which should alert the health care worker to the possibility of child abuse. They are:

1. **A delay in seeking medical care after an injury.**
2. **Unknown injuries—ones where there is no explanation.**
3. **Report of a self-inflicted injury or a sibling-inflicted injury.**
4. **A sequence of events that is not plausible--not consistent with the evidence.**
5. **If the child names an adult as having caused the injury, he/she is usually telling the truth (Schmitt, 1987).**

As a further explanation, if there are multiple bruises from a fall down the stairs, the bruises should all be of the same age. There should not be bruises in various stages of healing or fading. Bruises can be dated as to recency by the color of the bruise. The presence of a skull fracture or of multiple bruises is not consistent with a single fall out of bed (Schmitt, 1987).

The Trauma Nurse will have the usual duties of resuscitation and stabilization of the child, the details of which will depend largely upon the injuries inflicted. Once the child has been stabilized, very careful documentation of the injuries will need to be done and a complete "child abuse work-up" completed.

Throughout all of this, the nurse needs to keep the parents informed and should not pass judgment or place blame on the parents. The medical record will be needed to substantiate child abuse and in addition, the physicians and nurses caring for the child at the time of admission will probably have to testify as to the record and what they observed and recorded. Colored photographs may be taken as an assistance to the documentation procedure. The Social Worker will be involved in the care of the patient and in relating with the parents. Any court related issues will usually be handled through the Social Worker and he/she will keep the nursing staff informed.

The child admitted to the Emergency Department for suspected sexual abuse needs to be cared for by individuals with additional special training in this field. Often, hospitals will have a special "team" of individuals who need to be called in for assistance and/or consultation. Physical examination of the child needs to be done carefully in accordance with the collection of evidence which will likely be used in the court system. Additionally, interviews with parents (separately) and with the child will need to be done.

Physical examination of the child should carefully be done, noting any signs of tenderness or other evidence of additional trauma. Usually a bone scan is ordered to ascertain whether or not there has been other abuse. A special lamp is used throughout the examination, because it will more easily illuminate pubic hairs and semen. Rectal penetration will be evidenced by tenderness, lacerations and a decreased in rectal sphincter tone. Labial adhesions, tenderness and the presence of a vaginal opening larger than normal are all suggestive of sexual abuse. The child cannot be discharged home unless it can be assured that the home is a safe place for the child.

CARE OF THE TRAUMATICALLY INJURED CHILD IN THE INTENSIVE CARE UNIT

The differences in caring for children are also evident in the Intensive Care Unit. The child and his/her parents are actually one unit and should be cared for as one unit. Parents should be allowed to be with the child as much as they indicate they want to be. They will need assistance with understanding what is happening to their child, the equipment in Intensive Care and the enormity of what has happened in their lives. They may need assistance in dealing with feelings of guilt and inadequacy, especially if they feel

they had some responsibility for the traumatic injury or for the accident that occurred. The family is an important part of the support system for the child, so the nurse needs to be prepared to communicate and relate effectively with the family members. The child is immature both emotionally and cognitively and will not understand all that is happening to him/her. For this reason, parents will need to be present to assist with explanations. They will know the child's reference points and background and may be more effective in explaining something to the child based upon his/her own frame of reference. Parents are also more aware of the child's nonverbal clues as to pain, discomfort, etc. The nurse needs to quickly develop a sensitivity to these clues so that he/she can meet the child's needs even if parents are not at the bedside. The nurse is often the bridge between the high technology of the modern day intensive care unit and the patient and family. Bridging this gap is one of the exciting challenges of pediatric intensive care nursing. The nurses' role as a patient educator will also be a challenging one because he/she will have not only the child to teach, but will also have adults to relate to and to teach. It is imperative to meet patient teaching needs on both levels.

Learning takes place more easily when it proceeds from the simple to the more complex. This is a good way to build rapport not only with the child, but also with parents. The nurse can start by explaining to them what he/she is doing as a care is being delivered.

The information will need to be repeated more than once because the child as well as the parent may only hear a portion of the information, depending upon the individual's level of stress. Continuity of care gives is ideal, but not always realistic. Consistency can be established by having some written materials for the parents and for having some standard approaches as to what information is given to parents. Written material cannot be used as a substitute for verbal contact because some parents (as well as children) may not read. Health care workers can unwittingly raise the level of parental anxiety just by using different terminology to explain the same procedure. Parents may quickly decide that one person is more competent than another, not by care given, but by information related to them as to the care being given by the health care worker. The nurse is most often the center of this potential controversy just because of the amount of time spent at the bedside with the parents. Part of the goal for intervention with the family is not just to assist them to cope with the situation of hospitalization, but to actually grow and develop from the hospitalization and the traumatic injury.

Physiologically, the nurse needs to modify assessment skills and the usual intervention techniques so that they will be appropriate for children. The physiological discussion from earlier in this course will apply in the Intensive Care Unit as well as in the Emergency Department. In addition, there are some important aspects about caring for children beyond the resuscitative phase that need to be noted.

The pediatric intensive care nurse needs to develop some parameters by he/she can quickly determine the severity of the condition of the patient for whom he/she is caring. These will include both some qualitative and some quantitative measures and will give the nurse the overall impression of the patient's condition and may be more important than the latest set of vital signs. This assessment will include the following:

COLOR: A child's color is normally the same on both trunk and extremities. Nail beds, hands, feet and mucous membranes will all be pink. If a child is having cardiorespiratory distress, mottling of skin begins to appear and extremities and mucous membranes become pale. Cyanosis will not usually be in evidence until much further along in the cardiorespiratory decompensation.

WARMTH: The normal child's skin temperature is warm with almost instantaneous capillary refill. Poor perfusion and/or stress will result in cool extremities and sluggish capillary refill. The environmental temperature has to be considered because the child's extremities will also cool as a result of being cold.

ACTIVITY LEVEL AND RESPONSIVENESS: These will change and will change quickly if the neurological function and/or the systemic perfusion changes.

The **normal infant** will seek to look as a person's face, making eye contact easily and consistently. He/she will follow brightly colored objects readily. Extremities move readily and frequently. An infant in

distress may not sustain eye contact; may look away or refuse to make eye contact. The mildly distressed infant will hold his/her extremities flexed and will express facial grimaces. The infant's will be increasingly irritable and the cry will be high pitched and weaker than normal. As the infant deteriorates, the cry becomes non-existent and the infant's extremities become limp or flaccid.

The **toddler** does not like the strangeness of the hospital and does not want to be separated from his/her parents. The normal toddler will protest both a stranger caring for him/her and his/her parents leaving. Usually, the toddler is happy only when a parent is at the bedside and touching him/her, especially if another person is doing a procedure to him/her. If the toddler becomes lethargic or does not object to parents leaving, be concerned. The child's physical condition may have changed somewhat and may change more and quickly.

The **older preschooler** is usually able to verbalize pain and its location. The child's description of the intensity of the pain may not be reliable because the child has little reference point to describe the severity and quality of the pain. He/she just knows that it hurts. They will become paler and lethargic when they are tired or uncomfortable. The normal preschooler is interested in what the nurse or other health care worker is doing and in the equipment being used. The child will ask many questions. As a child's condition worsens, a whining tone of voice will be heard, the questions will change to demands and the eyes take on a strained look. As the condition further deteriorates, the child becomes quieter, more listless and lethargic. The questions cease, the talking ceases and the child may just look away so as to avoid using the energy to make eye contact.

The **school age child** is able to cooperate and is less fearful of procedures if they are explained ahead of time. This age child can also answer more completely the questions about symptoms. The child of this age is very sensitive about examinations, protective of their privacy and do not want their body exposed. An explanation of what is going to occur and provision for privacy will enlist their cooperation to a greater extent. The school age child whose condition is deteriorating becomes irritable, lethargic and then progress to unresponsive.

Adolescents vary in their emotional maturity to such a great extent that it is more difficult to make generalized statements about them as a group. The normal adolescent is interested in what is happening to his/her body and will ask questions. Often, they are fearful about the ultimate outcome of their injuries. They are cooperative, can give accurate information and will try to assist. As the condition of an adolescent deteriorates, he/she may regress in behavior, withdraw, become lethargic and not want to see anyone.

The normal behavior for a child of any age is to react to pain and attempt to withdraw from the pain. Absence of this response indicates either cardiorespiratory or neurological deterioration and should be responded to by the nurse. Also, if the child lies in bed, instead of sitting up, there is either pain, fear or serious illness present (Hazinski, 1992).

REACTIONS TO THE INTENSIVE CARE UNIT

Children admitted to an Intensive Care Unit will be affected by the strange environment and by the routines and equipment that he/she will encounter. Usual sleep cycles are not often considered when health care workers have procedures to do, when alarms are going off or when other tasks are to do accomplished in the environment. The environment for a young child in Intensive Care is quite different from children outside the unit—it's a world of ventilators swishing, cardiac and other monitors beeping (all with different beeps) instead of lullaby music and other children laughing and playing. Imagine listening to those sounds every waking moment (and in your sleep). Light is also stimulating to very sick children, especially reflected off light to white walls.

Suggestions for providing a more positive growth encouraging environment for any child in Intensive Care, including Neonatal Intensive Care are:

1. **SOUND STIMULATION:** Provide other sound stimulation. Provide or ask parents to bring in a small cassette tape player. If the child has favorite tapes, let them listen to those. If not, have a selection in a "library" that the volunteer can loan out to parents. Break up the child's waking hours as well as provide more soothing background music for sleep times. The overhead public address system is not appropriate both because of the music selection and because it is interrupted by the paging of individuals. If there is a music therapist on staff in the institution, enlist this individual's assistance in selection of appropriate auditory stimulation. The audio visual center will also be of assistance in selecting equipment and perhaps the tape duplication and maintenance.
2. **LIGHTING:** There is a need for abundant light to be available in the Intensive Care Unit, but not every child needs to be exposed to it the majority of the time. If lamps are available, they can be used. Also, the overhead lights can be wired in such a way that only part of them are on one electrical switch. Curtains can be drawn around the bed of the older child. The crib or isolette can be draped with a colorful small blanket or quilt. This not only assists with the lighting, but reminds people to speak more softly, little ones are sleeping. Some wall hangings or murals painted on the walls will break up the monotony of the white color and decrease any reflections.
3. **INDIVIDUALIZATION:** Encourage parents to bring in pictures of family members. Infants especially like faces. These should be taped within the line of vision of the ill child so that he/she can focus easily on the pictures. The names of the individuals in the pictures should be included so that health care professionals can use these familiar words in conversation with the patient as care is being given. Small, stuffed toys should be brought in for the child to have for comfort, visual stimulation and as an attempt to make the environment somewhat more normal.
4. **APPROACHES BY STAFF:** It is busy in Intensive Care Units and health care professionals are very busy. It is crucial, however, that the professional take the time to explain to the child and to the parents what is happening and what is going to happen. If they do not, the child often misunderstands what is transpiring, becomes more anxious and his/her condition may change as a result.

DEVELOPMENTAL ASPECTS

The next section identifies and discusses some of the developmental aspects relating to the various age groups and gives some approaches based upon the age of the child.

PLAY is a part of the development for a child. Play is the way a child learns about themselves, the world and themselves in relationship to the world. Play is differentiated from other activities and behaviors by six characteristics (Rubin, et al).

They are:

1. A child is **intrinsically motivated** by play. No outside stimulus is needed to encourage the child to play.
2. When children are playing, there is no concern for efficiency. The behaviors are **purposeless**.
3. Play focuses on the **discovery** of what the child can do with an object, not just in the identification of the object.
4. Play is **make-believe**.
5. The child's play is not **guided by** externally-imposed rules.
6. The child is **actively engaged** in the play and gains pleasure from it. Play is real to the child.

INFANTS

Separation is the overwhelming source of fear for the infant beginning at about six months of age. This fear can be directed at either parent or at a grandparent if they are actively involved in the primary care of the child, but is usually directed at the mother. Parents should be allowed to stay with their child during the hospital stay, including in the Intensive Care Unit. This may not be practical for a variety of reasons, so parents should have visitation privileges at any time during the 24 hour period and should be encouraged to visit. Robertson (1969) identified three phases of separation anxiety which illustrate the need for parents to be with their children.

The first is **protest**. The piercing cry of an infant when the parent leaves can be very traumatic for everyone within hearing distance. The infant will try to visually locate the parents and often the infant will have nothing to do with anyone who tries to console him/her. If the nurse has time to play with the infant during the time the parent is present, the child may more readily accept that person for consolation. Distraction with a toy may assist in the process.

The second phase is **despair**. In this phase, the infant may refuse to eat, play or anything but sit and watch the door, waiting for the parent to return. The infant will look very sad and forlorn and may rock or suck his/her thumb, clutching a blanket or stuffed toy. The infant may be angry with the parents when the parents return, but are quick to protest again when the parents leave.

The third phase is **denial**. In this phase the child has resigned to the separation by denying that he/she is longing for the parent. When the parent returns, they may be surprised to find a child who turns away and ignores them. Parents can feel as if they are not very important to the child and staff may reinforce this if they think that the child is becoming "well-adjusted" to parental absence. Both parents and staff need to understand the mechanism going on internally with the child. Part of the nurses' role is to assist in the maintenance of the integrity of the family unit.

There are three types of **PLAY** in which the infant engages (Whaley and Wong, 1983). The first type is **social-affective**. This is where the infant interacts with other people. They learn fun actions such as sticking out their tongues and other behaviors which they can imitate from adults (or older children). The second type of **play** is **sense-pleasure**. The infant has enjoyment from stimulation of the senses. They will look at birds, bright colors (especially if they are in motion), make rocking motions, and enjoy listening to pleasant sounds. The third type of **play** is **sensorimotor**. They discover that they have hands and feet and that they can have such fun with them. They begin oral testing of objects and will put almost anything in their mouth. They begin to enjoy the "game" of throwing items on the floor for someone else to retrieve. This is one that nurses and parents tire of quickly.

During this time, it is very difficult for the child to have restraints placed, even for his/her own protection. They need to be placed so that the child has maximum ability to move and to play as much as possible.

TODDLERS

If at all possible, a toddler should not be admitted to a hospital and when one needs to be in Intensive Care, it is a terrifying experience for that child. The toddler is still very dependent upon and attached to the parents. The main developmental tasks of this age are to begin to develop some autonomy and self-control. The toddler begins to see himself as a separate individual from the parent and is beginning to do some things for him/herself. The toddler now begins to move some distance away from the parents, but comes back frequently to reassure him/herself that the parents are still there. Parents represent safety and security to the toddler. Separations from the parents for any length of time are quite difficult, especially if there are other stressors for the toddler.

A stressor for the hospitalized toddler is the stress of being placed back in diapers if he/she has been in the process of toilet training. Going to the bathroom in the bed is even more stress provoking. Allow the toddler to use a bedside commode, if possible.

The toddler is very ritualistic about the sequence of his/her activities. If the same sequences can be adhered to while hospitalized, the stress is lessened for the toddler. A frequent time for ritual is bedtime. If the toddler is used to a certain pattern of events leading up to bedtime and that is not followed in the hospital, the toddler may have difficulty going to sleep.

He/she takes comfort from the consistency in the both the environment and in the schedule. Changes in either one require time for adjustment. The toddler can understand simple commands, but may say “no” even though he/she means “yes”. The concept of “yes” develops later than the concept of “no”.

Toddlers believe that events happen because of their thoughts and activities. They may associate their parents leaving with their “bad” behavior. The toddler also thinks that one behavior or incident caused the next event to happen. Toddlers go through a process called animism, in which they give life-like qualities or abilities to inanimate objects. This may be the reason that toddlers sometimes are terrified of machines and object.

With all of the above development occurring within the toddler, it would truly be a terrifying experience to be in an Intensive Care Unit. The Intensive Care Unit can be made less terrifying for the toddler by encouraging a parent to be with the child as much as possible and to have the same Nursing staff care for the child. Minimize the use of restraints and allow the child to sit on the parent’s lap for procedures if possible. Allow the child to “examine” the equipment prior to the procedure. This will ease his/her fears to some extent. Enter any of the child’s rituals on the patient care plan, so they can be followed by Nursing Staff if parents are not at the bedside. Briefly explain procedures just prior to doing the procedure. Comfort him/her as soon as the procedure is finished. Acknowledge the child’s feelings, set limits for behavior and then offer the child another activity to substitute for the unacceptable behavior. **Play** for the toddler is the way the toddler learns about his/her environment and learns to communicate. The use of bright mobiles, toys, selected books (preferably a parent to read them to him/her) and some very simple hardwood puzzles are all good quiet activities. The toddler will listen to audio tapes and will watch some video tapes for very short periods of time.

PRESCHOOLER (AGE 3-5)

Busy, busy, busy describes this age. This is the time of initiative, eager learning, enthusiasm, ready to explore the world. Developing verbal, social and motor skills very rapidly. Has feelings of guilt and anxiety about “bad behavior” and about wishing “bad things” for other people. May view hospitalization as punishment for “bad thoughts”.

It is important to explain procedures in detail to the preschooler. Little boys are especially concerned about the genital area because they are fearful of castration as a punishment for “bad behavior”. Any catheterization or other such procedure will be very frightening unless carefully explained.

If the preschooler is told that parents are leaving and given an opportunity to adjust to that, he/she will usually tolerate short periods of separation. He/she will question frequently “when will my Mommy be back”, but when reassured, will usually adjust. If the illness is very serious, or the child is in pain he/she may cry for the parents. The child may also use inappropriate behavior as a means of protest about the parent’s absence—such as throwing a toy or refusing to do as the nurse instructs.

Cognitive development is continuing to develop, but the child is still having difficulty differentiating between fantasy and reality. He/she still thinks that there is a causal relationship between events, so he/she may think the hospitalization is a direct result of and a punishment for “bad behavior”. If the child has been “wishing something bad would happen to....” and that individual is hurt or killed in the traumatic incident which hospitalized the child, the child may be terrified. The preschooler thinks that there must be a reason

for everything, so is constantly asking “why”. The child still prefers a routine, but adjusts more easily than the toddler. His/her attention span is also increasing.

Explain all procedures in advance, in order to decrease the child’s anxiety. Be honest. If it is going to hurt, tell the child that it is, but translate the amount of pain to something with which the child can relate, or have the child count through the procedure with the nurse. Parents can be helpful in these explanations. Have someone hold the child’s hand. Talk with the child after the procedure to elicit his/her viewpoint about the procedure. This gives the nurse an opportunity to clear up any questions and/or misconceptions. The child should be given an opportunity to discuss the traumatic episode as well as his/her experience in the ambulance and in the trauma center.

Play for this age preschooler can actually be used as a therapeutic tool to encourage the discussion of feelings in order to reduce anxiety about what has happened to him/her. The child may reenact the situation multiple times, playing different roles each time until he/she has mastered the anxiety. Puppets are a good tool to use with preschoolers because the puppets can voice feelings that the child has not yet voiced.

THE SCHOOL AGE CHILD (6-12)

This is the industrious age. Children are achieving goals. They are active not only in school, but in many extra activities such as athletic programs, dance, etc. Friends are important and peer group approval becomes important. The child is less dependent upon the family, but is an integral part of the family. Interrupting family and/or friends is anxiety-producing. While the child enjoys spending time away from the family, when he/she is sick, it is important to have the family support, especially from parents.

This developmental period includes the process of logical thought development and the beginning of deductive reasoning. The child is proud of accomplishments and new responsibilities; however, the child who experiences repeated failures will have lowered self-esteem. The child needs good explanations as to procedures and treatments. He/she will usually be quite cooperative. Crying and protest behavior will occur and the nurse must help the child to understand that this is not an indication of any weakness, but is a rather normal reaction to what has happened.

The school age child will be sensitive to the noise factors in the Intensive Care Unit, but can be entertained with audio cassettes and video cassettes. Fears are more realistic but loss of control becomes an issue.

Play for the school age child may be the best way to relieve the boredom that becomes evident as soon as the child begins to get well. This age child can also participate in his/her own care in a modified way as he/she improves. Videos, audio, cassettes, hand-held computer games are all diversions which the child can quietly enjoy.

ADOLESCENTS

The turmoil of the adolescent years is well documented. The Intensive Care Unit staff will enjoy special challenges trying to meet the adolescent’s needs. Stephens (1988) has identified four benefits that adolescents gain from being hospitalized. These benefits are: an expansion of their social network, respite from responsibilities, improved physical well-being and a positive perception of self. The adolescent has several developmental tasks to accomplish during the adolescent years. They include: adaption to a rapidly changing body, the development of a sense of identity, including sexual identity, separation from parents and the establishment of an autonomous functioning (Stephens, 1988).

Adolescents display unpredictable and inconsistent behavior, with mood swings, depression and some antisocial behavior. Whaley and Wong (1983) indicate that if the adult or child exhibited the behaviors that adolescents exhibit, they would be thought to be borderline pathological. There are three stages to

adolescence: early, middle and late, with indistinct time frames (Hazinski, 1992). The early years of adolescence are primarily occupied with body image issues. Early adolescents are concerned about every imperfection. They are certain that if they can see it, so can everyone else (Elkind, 1970). They also think they are the only ones who have ever had that particular problem. The peer group grows in importance, but parental influence is still very strong. If the adolescent is injured during this time, dependency upon parents is strong, with the primary concern being how this injury will affect their appearance and mobility (Hofmann, et al, 1967).

Mid adolescence turmoil is the most difficult. The mid-adolescent is still very occupied with appearance and now is also quite concerned about his/her appearance to the opposite sex. Conflict with parents increases. These conflicts are usually over such issues as autonomy, accountability and self-determination. The mid-adolescent is experimenting with different ideas, behaviors and roles in the peer group, trying to see what "fits" (Hofmann, et al, 1967). The emphasis during these middle adolescent years is so strongly on appearance and what the peer group will think that if the adolescent is traumatically injured and hospitalized the entire focus will be on how the accident will affect his/her appearance and how will the peer group react. The mid adolescent will be particularly anxious about anything that will make him/her different (and therefore perceived as unacceptable) to the peer group (Hofmann, et al, 1967).

The late adolescent years (17-22) have somewhat less turmoil. The adolescent has now worked through some of the issues with parents and will now seek the parent's advice before making his/her own decisions. There are many choices during this period. They include educational choices, job/career choices and marriages. Traumatic injuries during this period of time potentially could affect all of those decisions. The critically injured adolescent will be concerned about the effect of the injuries upon his/her future (Hofmann, et al, 1967).

The adolescent is quite capable of being a participant in his/her own care. They are able to think about long-term consequences of the injuries and adjustments which may need to be made. There may be some guilt associated with the traumatic accident because the adolescent may have been responsible for the accident.

Adolescents take some dramatic risks, seemingly without concern for their life or for the life of another (Hofmann, et al, 1967). Adolescents need detailed information in preparation for any procedures. They may be reluctant to show their lack of knowledge about their bodily systems and will not readily ask questions.

The health care professional should explain without having the expectation that they have an in-depth understanding of their body. Adolescents sometimes act in dramatic fashion to minor injuries and illnesses. Part of their reaction is to the way in which information is given. Approach the adolescent tactfully, without being condescending to him/her. Because they are fearful of changes in body image due to the injuries, the adolescent may come across as a "know-it-all", pretentious and conceited (Whaley and Wong, 1983). The adolescent in the Intensive Care Unit is frustrated because of the helplessness they feel. A concern is that others will find out just how confused they are, so they hide their confusion, even from themselves. Separation from the peer group is very upsetting and some provision should be made for friends to visit. Careful control will have to be maintained or the numbers will be unmanageable. The adolescent may be glad to be separated from parents, but will have ambivalent feelings about wanting them at the bedside.

Privacy is of immense importance to the adolescent. They are especially sensitive to any exposure of the genital areas. All members of the Health Care Team need to be very aware of the potential for embarrassment and provide for privacy during all examinations and discussions with the adolescent. Lack of respect for the privacy is likely to cause the adolescent more stress than actual pain will cause (Whaley and Wong (1983).

Adolescents may use a variety of coping mechanisms to deal with their stress. Some will withdraw, some will intellectualize. They want just the facts and will take notes, ask for reading materials about their injuries; but will have some difficulty coping with the emotional aspects of what has happened to them.

Some will regress to more child-like behavior, becoming more dependent upon the staff and upon their parents. This enables them to avoid coping with the emotional issues that they just can't handle at that time (Savendra, 1979).

PLAY for the adolescent needs to take on the form of listening to tapes (through headphones), watching television, writing in a diary, daydreaming, talking with a close friend and later, using a punching bag.

FAMILIES

The health care professional needs to integrate the family into the care of the patient as much as possible. The attitude should be one of expectation that parents will be at the bedside unless there is a valid reason for them to step out of the room. This is the child's family and is the group to which the child will be returning once the hospitalization is over. The nurse should be careful not to make judgments about the family, but should try to assist them to develop more adequate coping skills. These families are undergoing tremendous stress.

If the traumatic injury is due to an accident, parents may still be in shock. The fact that their child is in Intensive Care means, to many people, that the child is near death. The Intensive Care unit itself may be a stressor because most people have not seen all of the equipment and tubes; and they have not seen them all attached to their child. They feel very helpless; not even knowing where then can touch the child for fear of dislodging something. They feel powerless because they are the ones used to being the caretaker and protector (Lewandowski, 1977).

The health care professional needs to recognize that individuals under stress do not function at their usual levels. Sedgwick (1975) describes seven responses of individuals under stress:

1. Reduced ability to utilize incoming information. Explanations and information will have to be repeated. All professionals should try to use the same terminology because parents think they are being given different or conflicting information when different terms are used to explain the same condition. Give only small amounts of information at one time, because only a small amount will be absorbed. It may be helpful to write the information and give it to the family so they can discuss and absorb it at a later time.
2. Decreased ability to think clearly and to problem-solve. Parents may seem confused and unable to process information given to them. Organizing thoughts, drawing conclusions and making decisions seem almost impossible. Attention will be given to small details while life-threatening issues are ignored.
3. Reduced ability to master tasks. The individual under tremendous stress may not even be able to fill out the form correctly and see the line on which they must sign. This is due to altered perception of the environment and an inability to draw on resources.
4. Decreased sense of personal effectiveness. The parents may feel lost, not knowing what to do. Control of their child is now in the hands of someone else and there seems to be nothing that they can do. Give the parents something to do for the child; rubbing his/her back, putting a cool cloth on the forehead, something simple, that takes no thought or decision making ability.
5. Reduced ability to make effective, constructive decisions. The health care professional needs to give information to parents in a very structured format, telling them at what point decisions have to be made and making sure that they have all of the information with which to make the decision. Parents need some private time for discussion before a decision is made. They need time to just process the information and make the decision.
6. Heightened or decreased sensitivity to self. Some parents will neglect themselves, devoting all energies to their child, forgetting even to eat. Others become focused on themselves and may react out of proportion to minor irritants.
7. Decreased sensitivity to the environment. Stressed parents will miss cues. Direct communication is the best approach. The levels of stress described above are in danger of entering a crisis state,

where their functioning will be even more impaired. There are three balancing factors described by Aguilera and Messick (1982). These are:

- a. A realistic perception of the events.
- b. Adequate situational support.
- c. Adequate coping mechanisms.

A member of the Health Care Team (usually a Social Worker) need to assess the family situation and develop the plan for appropriate intervention if it is needed.

The parents of a critically ill child will go through a process very similar to the grieving process. These steps include: denial, anger, bargaining, depression and eventually acceptance. It takes time for an individual to go through this process. Not all individuals go through it in the same order and at the same rate (Hazinski, 1992).

THE DYING CHILD

The child in Intensive Care who has been traumatically injured and is dying as a result needs some special attention. If the child is alert, he/she may initiate some comment about dying. As this occurs, the nurse can explore the child's feelings about death with age appropriate comments. In the traumatically injured, the parents are the more likely ones to need the assistance to cope with the dying issue. As team members talk with the parents to give condition, the path needs to be paved to actually inform them about the child's death and to ask about organ donation if the child is potentially a donor. It is best if one person can consistently give these condition reports and if the parent has a support person present during this time. Ideally, this is the individual to bring up the issue of organ donation. Parents who have had this experience have shared that being able to offer another child life seemed to help the "make some sense" out of their child's death. They were grateful for being given the opportunity to donate. When the child dies suddenly, as many happen with the traumatically injured child, the parents are still in denial and shock and may have difficulty focusing on this issue.

THE CHILD IN PAIN

There are several clinical studies which document that the administration of analgesic agents to children is inadequate. Table 1 illustrates the developmental characteristics of children's responses of pain.

TABLE 1
DEVELOPMENTAL CHARACTERISTICS OF CHILDREN’S RESPONSES TO PAIN

<p>Young Infants Generalized body response of rigidity or thrashing, possibility with local reflex withdrawal of stimulated area Loud crying Facial expression of pain (brows lowered and drawn together, eyes tightly closed and mouth open and squarish (Fig. 20-3) Demonstrates no association between approaching stimulus and subsequent pain</p>	<p>School-Age Child May see all behaviors of young child, especially during actual painful procedure but less in anticipatory period Stalling behavior, such as “Wait a minute” or “I’m not ready” Muscular rigidity, such as clenched fists, white knuckles, gritted teeth, contracted limbs, body stiffness, closed eyes, wrinkled forehead</p>
<p>Older Infants Localized body response with deliberate withdrawal of stimulated area Loud crying Facial expression of pain and/or anger (same facial characteristics as pain but eyes are open) Physical resistance, especially pushing the stimulus away after it is applied</p>	<p>Adolescent Less vocal protest Less motor activity More verbal expressions, such as “It hurts” or “You’re hurting me” Increased muscle tension and body control</p>
<p>Young Child Loud crying, screaming Verbal expressions of “OW”, “Ouch”, “It hurts” Thrashing of arms and legs Attempts to push stimulus away before it is applied Uncooperative: needs physical restraint Requests termination of procedure Clings to parent, nurse or other significant person Requests emotional support, such as hugs or other forms of physical comfort May become restless and irritable with continuing pain All of these behaviors may be seen in anticipation of actual painful procedure</p>	

Data from Craig KD and others: Developmental changes in infant pain expression during immunization injections. Soc Sci Med 19(12):1331-1337, 1984; and Katz ER, Kellerman J, Siegal SE: Behavioral distress in children with cancer undergoing medical procedures: developmental considerations, J Consult Clin Psychol 48(3):356-365, 1980.

The child may have difficulty expressing that he/she has pain, but there are physiological signs that the patient has pain and the nurse needs to be proactive in the administration of analgesics. Some of the symptoms nurses should evaluate are:

1. Marked increases in blood pressure and heart rates.
2. Restlessness and agitation.
3. Irritability with a short attention span.
4. Irritability, with little success in comforting the child.
5. Facial grimaces and holding or favoring the part of the body that hurts.
6. Large fluctuations in transcutaneous oxygen tension (Venus, et al, 1981).

There are several assessment scales for measuring pain in children, but they are not as useful with the child in Intensive Care because of the severity of the child's condition and the distractions in the Intensive Care Unit (Hazinski, 1992). Table 2 indicates the children's development concepts of illness and pain.

**TABLE 2
CHILDREN'S DEVELOPMENTAL CONCEPTS OF ILLNESS AND PAIN**

Concept of illness*	Concept of pain†
<p>PREOPERATIONAL THOUGHT (2 TO 7 YEARS) Phenomenism: Perceives an external unrelated, concrete phenomenon as the cause of illness (e.g., "being sick because you don't feel well") Contagion: Perceives cause of illness as proximity between two events that occurs by "magic" (e.g., "getting a cold because you are near someone who has a cold")</p>	<p>Relates to pain primarily as physical, concrete experience Thinks in terms of magical disappearance of pain May view pain as punishment for wrongdoing Tends to hold someone accountable for own pain and may strike out at person</p>
<p>CONCRETE OPERATIONAL THOUGHT (7 TO 10+ YEARS) Contamination: Perceives cause as a person, object, or action external to the child that is "bad" or "harmful" to the body (e.g., "getting a cold because you didn't wear a hat") Internalization: Perceives illness as having an external cause but as being located inside the body (e.g., "getting a cold by breathing in air and bacteria")</p>	<p>Relates to pain physically (e.g., headache, stomachache) Is able to perceive of psychologic pain (e.g., someone dying) Fears bodily harm and annihilation (body destruction and death)</p>
<p>FORMAL OPERATIONAL THOUGHT (13 YEARS AND OLDER) Physiologic: Perceives cause as malfunctioning or non-functioning organ or process; can explain illness in sequence of events Psychophysiologic: Realizes that psychologic actions and attitudes affect health and illness</p>	<p>Is able to give reason for pain (e.g., fell and hit nerve) Perceives several types of psychologic pain Has limited life experiences to cope with pain as adult might cope despite mature understanding of pain Fears losing control during painful experience</p>

*From Bibace R, Walsh ME: Development of children's concepts of illness, Pediatrics 66 (6) 912-917, 1980

†From Hurley A, Whelan EG: Cognitive development and children's perception of pain, Pediatr Nurs 14(1):21-24, 1988

Once the nurse has determined that the patient has pain, he/she needs to take the appropriate action to relieve the pain and to make certain that the information which he/she has gained is entered into the patient care plan so that the next nurse caring for the patient will have additional information on which to base his/her decision about the patient's pain.

CARE OF THE CHILD WITH A HEAD OR NEUROLOGICAL INJURY

Approximately 500,000 head injuries occur in children annually. About 25,000 of these children will die or be permanently disabled (Eichelberger and Pratsch, 1988).

All children with a moderate to severe head injury should be admitted to the Intensive Care Unit after leaving the Trauma Unit. It needs to be assumed that these children also have spinal cord injuries until these are ruled out. A CAT scan should be performed as soon as possible after admission to the Trauma Unit.

Definitive treatment will be based upon the CAT scan as well as the child's other injuries (Hennes, 1988). The newly admitted child with a head injury should be immediately assessed for the establishment and maintenance of an adequate airway, ventilation and systemic perfusion. Increased intracranial pressure can cause apnea. Hypoventilation and hypercapnia can cause increased intracranial pressure, therefore, adequate ventilation must be maintained (Hazinski, 1992). A nasogastric tube should have been placed in the patient during the time in the Trauma Unit. This will allow for decompression of the stomach and prevent vomiting.

The child needs to be carefully assessed for adequate systemic perfusion. The nurse should check for capillary refill. It should be brisk and the nail beds should be pink. Peripheral pulses should be checked for rate, but particularly for strength of the pulse. The blood pressure should be checked and should be age appropriate. Urinary output should be 1-2ml/kg/hr (Hazinski, 1992). Once it has been established that the cardiopulmonary function is being maintained, the nurse needs to do a complete neurological assessment. The neurological assessment will include a determination of the level of consciousness, pupil size and response to light, and assessment of motor reflexes and activities, including the child's ability to follow commands. The Glasgow Coma Scale can be used in the Intensive Care Unit as well as in the Emergency Department. It is good follow up to use the same scale so that any changes can be more readily ascertained. Pupil size and responsiveness should be checked frequently (usually there is a protocol for the frequency). The pupils should be equal in size and respond equally to light.

The nurse needs to be observant for any seizure activity. This should be immediately reported and appropriate safety precautions should be taken to prevent injury. Status epilepticus must be treated because it will compromise blood flow. Any abnormal signs of posturing must be reported to the physician immediately. Intracranial pressure monitoring may be established prior to the patient's admission to the Intensive Care Unit and must be closely monitored. The nurse and physician should have an established plan of action for responding to rises in intracranial pressure monitoring readings. There will be orders for additional hyperventilation to be performed, diuretics and/or anesthetic agents to be administered. There may be a ventriculostomy catheter and closed drainage system in place. Adjustments may need to be made in this, but will require either a protocol or a specific physician order. A sudden change in the patient's level of irritability, confusion, lethargy or pupil dilation needs to be immediately reported.

As the nurse is giving ongoing care, he/she needs to further assess the patient for any additional injuries which may be present and were not attended to earlier, during the resuscitative phase. The nurse should look for lacerations, hematomas, edema and any depressed areas on the scalp. The child needs to be kept warm because cold stress can cause additional oxygen consumption and peripheral vasoconstriction.

Skin and rectal temperature readings should be taken frequently. Poor systemic perfusion would be indicated if the rectal temperature was elevated and the skin temperature low. Once the child has stabilized, the specific injury will be treated. The following are the most common forms of pediatric head injury:

1. **CONCUSSION:** Requires little treatment except for observation by parents for headaches, dizziness and fatigue for several days after the concussion.
2. **CONTUSION:** The treatment is determined by the specific amount of cerebral injury and the severity of any secondary cerebral injuries. About 10% of these children will develop seizure activity after the contusion (Hahn, 1988).
3. **SKULL FRACTURES:** Children should be observed for the development of subdural or epidural hematomas. Otherwise, the majority usually do not require any treatment (Barkin and Rosen, 1990).

Depressed skull fractures: This is elevated surgically. The usual post-operative care is required.

Compound skull fracture: This will be repaired surgically and any necessary debridement will be done at the same time.

Basilar skull fracture: These children need to be hospitalized for observation, specifically for the drainage of CSF. Antibiotic therapy will be instituted if there is drainage.

Most leaks will seal themselves in a few weeks, but if not, surgical repair will be necessary (Hazinski, 1992).

4. **EPIDURAL HEMOTOMA:** The increased intracranial pressure will need to be treated prior to any surgical intervention. Any decreased level of consciousness will need immediate surgical intervention.
5. **ACUTE SUBDURAL HEMOTAMA:** These patients need to be closely monitored, but may not need surgical intervention. The management of the intracranial pressure will require diligence and aggressive treatment.

SPINAL CORD INJURY

The child with a spinal cord injury will have the spinal cord immobilized until the child is stable, then the appropriate therapy is started. Steroid therapy is suggested in order to prevent secondary spinal cord edema and inflammation. Surgical intervention is rarely a treatment modality.

CHEST TRAUMA

Children most frequently have non penetrating chest injuries, usually from automobile accidents. These injuries are quite serious because there may be fatal internal injuries.

When a child sustains a chest injury, it is uncommon for the child to have fractured ribs because the rib cage is more compliant and resilient than in the adult. However, the absence of fractured ribs does not eliminate the possibility of serious injuries. If there are rib fractures, there is likely to be a pneumothorax, hemothorax or a pulmonary contusion. There may also be fracture of the sternum and lacerations of the trachea, bronchi and heart. Rupture of the larynx and pericardial tamponade may also be present. The penetrating injuries are most likely caused by knives, bullets or ice picks. If a tension pneumothorax is present, there will be severe hypoxemia and decreased cardiac output. Extreme respiratory distress and extreme compromise of the systemic perfusion should suggest cardiac tamponade. Traumatic rupture of the trachea or bronchi will be indicated by severe respiratory distress and a large pneumothorax. There will be hemoptysis and a large air leak on both inspiration and expiration after a chest tube is inserted. Cardiac contusion should be considered any time there is blunt chest trauma (Hazinski, 1992).

The rapid assessment of the child with chest trauma will have been accomplished in the Trauma Center. When the child arrives in the Intensive Care Unit, the nurse will monitor the chest tubes, noting the amount of air being evacuated from the chest. The area around the chest tube will need to be observed when the dressing is changed for any drainage, erythema or subcutaneous emphysema. Cardiac tamponade is life-threatening. A pericardial aspiration is done, under EKG monitoring. The nurse needs to monitor the EKG and systemic perfusion, bringing any cardiac arrhythmias or S-T segment changes to the attention of the physician doing the cardiac aspiration.

The first priority of the nurse when caring for the child with a chest injury is to maintain adequate cardiopulmonary functioning and identify low cardiac output or respiratory distress (Hazinski, 1992).

ABDOMINAL INJURIES

Two of the most important indications of abdominal trauma are rapid, shallow breathing and abdominal tenderness. Progressive abdominal distention is one of the first signs of abdominal injury (Tepas, 1988). If there is unilateral splinting of the respirations, spleen/liver damage should be suspected (Seidel and Henderson, 1987).

The pediatric patient with blunt trauma needs to be closely monitored. Vital signs should be taken frequently and the nurse should be aware of any signs of hemorrhage or abdominal pain. Rapid surgical intervention may be needed if deterioration occurs quickly. Use of the peritoneal lavage is currently undergoing re-evaluation (Tepas, 1988). Information received from the lavage is not now as critical to the care of the patient since more physicians are accepting a non-operative approach to treating splenic lacerations. Additionally, the insertion of a lavage catheter causes abdominal tenderness which may confuse further abdominal evaluation. The peritoneal lavage will not reveal the presence of retroperitoneal

bleeding (Tepas, 1988). Neff and Kitt (1993) list the following as indications for the use of the peritoneal lavage:

Altered response to painful stimuli because of head trauma;
Altered response to painful stimuli because of alcohol or drug ingestion;
Fractures of the lower ribs, pelvis, lumbar spine;
Positive abdominal findings;
Hemodynamic instability.

The CT scan has been a major factor in accurately diagnosing abdominal trauma in a non-invasive manner. If the conservative approach is used, the patient may have stopped any bleeding prior to arrival at the hospital. This patient still must be closely monitored for any change in condition which might necessitate surgical intervention (Zeigler, 1988). Sepsis from peritoneal contamination, ongoing hemorrhage and organ dysfunction are all complications which can be experienced later (Ramenofsky, 1987).

MUSCULOSKELETAL INJURIES

Musculoskeletal injuries are noted during initial assessment, but they are managed after other injuries are stabilized. Fractures in the long bones can constitute an emergency because they are highly vascular and blood volume can be depleted in the child (Neff and Kidd, 1993).

The history should include the possible mechanism of injury and the physical examination should include observations for color, coolness, tenderness, deformity, swelling, pallor, peripheral pulses (especially noting any diminishment in pulses) and any wounds. If a wound is present, it should be cultured, cleaned and dressed with a moist, sterile dressing. Antibiotic therapy needs to be instituted and an orthopedic consult ordered (Hazinski, 1992), Neff and Kidd, 1993).

One of the complications of orthopedic injuries for which nurses need to observe is compartment syndrome. The extremities most likely to be affected by this are the lower leg and the forearm. This is brought about because of constricted edematous tissue within a muscle compartment. Sheaths of fascia surround muscle fibers, creating compartments. When these compartments are constricted (whether due to bleeding, a pneumatic shock garment, or edema), vascular supply to both muscle and tissue is compromised. Both ischemia and nerve damage can be the result (Mourad, 1991), (Hazinski, 1992). Signs which may indicate compartment syndrome are:

- ✓ **Pain (worsens with movement);**
- ✓ **Edema;**
- ✓ **Altered movement and sensation;**
- ✓ **Decreased perfusion (extremity cools and pulses diminish).**

If these signs are present, a physician needs to be notified so that the pressure can be relieved before any permanent damage occurs. Pressures equaling or exceeding 30 to 60 mm Hg require treatment to relieve the pressure (Hazinski, 1992). Ischemia for a period of longer than six (6) hours can result in permanent damage (Mourad, 1991).

CARE OF THE PATIENT IN A CAST

A cast may not be placed on a child for up to 48 hours after the injury to allow for swelling to decrease, unless vascular compromise exists (Neff and Kidd, 1993). During the time a case is drying (may be 2-3 days), the cast must be well supported on a firm surface. Soft surfaces may lead to molding of the cast into the soft surfaces. When the casted extremity is being moved, the palms of the hands should be used. This will keep the fingers from indenting the soft cast. The cast should always be lifted by supporting the

extremity under two joints. This prevents stress at the site of injury as well as stress on the cast. The patient should be turned every two (2) to four (4) hours to allow all surfaces to dry and the cast should be left uncovered to aid in the drying process (Mourad, 1991).

CARE OF THE PATIENT IN TRACTION

Traction is used to restore alignment following a fracture, maintain alignment while a fracture heals, to overcome a deformity and to relieve muscle spasms and/or pain. For the greatest effectiveness, the pull of the traction needs to be constant, both in amount and direction (Mourad, 1991).

There are two methods for applying traction:

SKIN TRACTION is applied indirectly to the bone by applying the pressure to the skin and the subcutaneous tissue around the fractured bone. It is usually applied for up to one week. Can be applied intermittently, removed for skin care and rest. Usually used for less severe injuries.

SKELETAL TRACTION is applied directly to the bone by using a pin or wire and attaching pulleys and weights. Skeletal traction is used for longer periods of time and cannot be discontinued until the time it is removed. It is used for the more severe injuries.

NURSING CARE includes assessing the patient's extremity for color, temperature, edema, any signs of pressure, capillary refill, numbness, burning, itching, tingling, pain, rash and muscle spasms. In addition to assessing the extremity, the traction should be checked. The intent is to verify that the traction is still in alignment so that it is correctly pulling on the extremity (Mourad, 1991).

Other areas of care the nurse needs to focus on with the child are nutritional needs, adequate bowel and urinary elimination and level of contentment being so confined. Meeting the needs of a confined, usually active child may be a significant challenge for the nursing staff even while the patient is still in the Intensive Care Unit. Early involvement of the dietician and the play therapist or occupational therapist will be very helpful.

The physical therapist will usually be involved early to begin making plans for the rehabilitation phase and to advise regarding any exercises which should be started while still in traction.

CARE OF THE PATIENT WITH BURNS

Fluid replacement is a crucial issue with burned children. Within the first 12 to 36 hours fluid shifts from the intravascular space to the interstitial space because of the increased capillary permeability. This shift is called "third-spacing" because the fluid is not in either the intravascular or intercellular spaces, but is in a third space (interstitial space). If the intravascular fluid is not replaced, cardiac output will decrease, hypovolemia will occur and systemic perfusion will decrease. The seriousness of this issue is largely dependent upon the severity of the burn. Electrolyte balance needs to be carefully monitored. Intravascular proteins, plasma, potassium and other electrolytes are being lost into the interstitial space.

As capillaries heal (approximately 24-36 hours after a burn), intravascular fluid loss stops and fluid begins to shift back into the intravascular space. As this occurs, fluid volume replacement needs to be decreased. Urine output increases and edema decreases. Body weight returns to normal. The nurse should be alert for the diuresis which should occur as well as observing for hyponatremia and hypokalemia. The hyponatremia will occur 80% because sodium excretion is greater during diuresis. The hypokalemia will occur because of the potassium returning to the intracellular space (Hazinski, 1992).

A major cause of morbidity and mortality in burned children is respiratory insufficiency due to inhalation of smoke, fumes, steam or super-heated air (Herdon, 1985). Inhalation of any of these irritants will cause

edema, erythema and blistering in the upper airway. The increasing edema may cause upper airway obstruction. Sloughing of these damaged tissues may begin with 48 to 72 hours and may also cause upper airway obstruction (Charnock and Meehan, 1980). The nurse must remain alert for respiratory system compromise.

When the cardiac output decreases, the brain shifts circulation away from less vital systems to the brain and heart, in order to maintain their functioning. When this occurs, blood flow decreases to the gastrointestinal system. Decreased gastrointestinal perfusion can result in impaired motility. Severe impairment in motility results in further reduction in perfusion, causing intestinal ischemia to develop. This may increase the permeability of the mucosa of the gastrointestinal system to gram-negative bacteria and endotoxin, paving the way for gram-negative shock to develop. Severe abdominal distention can also occur. The gastrointestinal perfusion and motility will improve when hypovolemia and cardiac output are corrected (Hazinski, 1992).

A burn is a major body stress. The burned patient has a high oxygen consumption and high caloric requirements. Increased dietary requirements are high, especially for additional protein. The burned patient is at a high risk for infection. The burn has removed the first line of defense against infection...the skin.

NURSING CARE OF THE BURNED PATIENT will include the following:

1. Constant assessment and calculation of fluid requirements, output and systemic perfusion. Replacement of fluids as ordered by the physician. Maintenance of patient position and movement to avoid further compromise of blood flow and to prevent disabilities related to movement. Relieve discomfort and pain as necessary.
2. Constant monitoring of the patient's respiratory effort, including rate and effort. Maintain airway patency and administer oxygen as necessary. Be sure that pain relief is adequate. Encourage deep breathing to clear airway.
3. Monitor wound appearance, white blood cell count and differential, temperature, strict aseptic technique during all invasive procedures, good hand washing techniques at all times.
4. Monitor for signs of cold stress. Utilize heat warmer as necessary. Minimize exposure as much as possible, especially during treatments. Warm intravenous fluids according to hospital policy. Monitor (with dietician) the dietary intake and requirements.
5. Assess patient for analgesia needs and for coping skills to manage pain, fear and anxiety. Administer analgesics as necessary. Explain procedures to allay fears. Encourage parents to be at the bedside.
6. Recognize that the child may have issues relating to self-concept depending upon the location and extensiveness of the burn. Allow as much independence as possible.
7. Plan appropriately for home care and/or rehabilitation.

REHABILITATION

Rehabilitation for the child who is a trauma victim is an area which needs additional attention. Many trauma victims who would improve with rehabilitation are never referred for rehabilitation by their physicians (Brogan, 1981). The child who is injured has not completed the growing cycle. As he/she develops, especially the brain, additional problems affecting learning, perception, etc may develop which were not even considered at the time of his/her acute care. The child who is referred for rehabilitation will have these issues addressed more easily than the child who is not into that system. The child's needs may be able to be met by a home health service or by the family, depending upon the support systems available.

Rehabilitation, for some children, will present difficulties for the family because the facility is located some distance from their home. In order for the child to go to the facility and receive adequate family support may require extensive planning upon the part of the family. For this reason (plus others), families need to be included early in the process of planning for rehabilitation. Another reason for early inclusion in the

process is the issue of funding for rehabilitation. Rehabilitation facilities are usually for profit institutions, and as such, do not take patients without adequate funding sources. Families (working with Social Services) will need time to make appropriate arrangements. If these processes are started early, the child's transfer to a rehabilitation facility in a timely manner should not be interrupted.

If the child is to be discharged home, plans must be carefully made with the caretakers to make sure that the home care is planned and that the family knows what to expect and what to do in case of an emergency situation. A home visit by the home health nurse prior to discharge is often helpful in planning for the child's homecoming.

MONITORING THE CHILD

As soon as the traumatically injured child starts receiving assistance from the emergency medical system until he/she has been discharged from the acute care facility, technical monitoring will assist the nurses and physicians to know what is happening physiologically to the child. The nurse must know what information the monitoring should provide, how to interpret the data in relationship to the observations made clinically of the patient and how to determine if the equipment is giving inaccurate data. This section will discuss monitoring, support and measuring devices specific to the critically injured child. Earlier in this course specific information relating to children was discussed. That previous information needs to also be used when caring for the child who is being monitored.

One of the factors in designing equipment to be used on children is the issue of size. As an example, electrodes need to be placed for cardiac monitoring. The child has much smaller space available for placing the electrodes than the adult. This may affect design and usage of the equipment. The child's respiratory system and cardiovascular system are both smaller than the adult. Obviously small equipment and supplies need to be used, but there are also some physiological differences which need to be noted.

The size of the respiratory system is smaller. Not only do endotracheal tubes and airways need to be smaller, ventilators need to be capable of providing smaller amounts of pressure and volume with short inspiratory times. The equipment must be capable of measuring the very rapid breathing of the distressed child accurately. Because the child has a very compliant chest wall and small lungs, it is easy to hyperventilate the child and cause a pneumothorax. Manual ventilation may need to be done initially, but the child should be placed on an appropriate ventilator as soon as possible. The child's metabolic rate is higher than the adult. Rapid heat loss may cause fluctuations in the child's temperature which may cause extra labor to an already taxed respiratory system. This can cause a child to use significantly more oxygen. The child's temperature needs to be frequently and carefully monitored.

Monitoring devices need to be accurate without recording artifact as clinical data. Very small changes in such vital signs as blood pressure and pulse rate may signify critical differences in the condition of the child. Arteries and veins are smaller in size. Not only do catheters need to be smaller, additional consideration needs to be given in order to maintain patency of the catheters.

It is critical that the devices measuring intake, especially parenteral intake, measure accurately, in small volumes and in small veins and arteries. The ventricles of a child's heart function almost at maximum output when he/she is well. When the child is injured, the cardiac output will depend more on heart rate than on stroke volume. The cardiac monitor must be able to measure the heart rate accurately without artifact. The monitors used to measure cardiac output and blood pressure must also be very accurate as small changes in blood pressure and cardiac rate may mean significant change in the patient's condition.

During ventilation of the child, care must be taken not to hyperventilate the child with either too much volume or too much pressure. Hyperventilation is easy to do in a child because the child's chest wall is not very resistant. A child also normally has small tidal volumes and short inspiratory times. When the child is breathing rapidly, he/she has an increased heat and water loss through the respiratory system. Therefore, an assisting device for the child must heat and humidify the air provided. Changes in the child's temperature will mean an increased need for oxygen to be provided because the child has increased oxygen consumption. Temperature monitoring is important because of the changes in heat loss. The

nurse will want to involve the dietician to evaluate the child's nutritional status because small changes in daily caloric intake may result in significant nutritional changes for the child. The child normally has a high metabolic rate and this can increase when there are physiological changes such as an elevated temperature. Invasive monitoring in the child greatly increases the possibility of the development of an infection.

EKG MONITORING

The most common type of monitor for the child to have is the EKG monitor. It is with the standard of care for any patient in the Intensive Care Unit to have an EKG monitor. The child may also be monitored in a step-down type of unit. The nurse needs to know how to read the EKG reading and to be able to determine the appropriate actions to take based upon those readings. As a reminder, the nurse needs to remember that the EKG is measuring the electrical activity of the child's heart and not the mechanical activity of the heart. The EKG furnishes not only the absolute heart rate, but also the sequence of intracardiac conduction. The nurse needs to be careful to clean the skin with alcohol prior to placement of the leads so that the EKG can provide a stable reading without the interference of skin oil and/or dry skin cells. Many of the monitoring systems in use today not only furnish an accurate EKG, but also provide arterial and venous pressure readings, temperature and respiratory rate.

Alarm limits (both high and low) must be set and verified for each parameter being monitored. These limits must be checked each shift and before the nurse leaves the bedside for any reason. Each Intensive Care Unit will have its own standards as to how often the readings need to be printed out and placed in the patient's medical record.

When assessing the child, it is important to have an indirect measurement of the child's blood pressure, but it is often quite difficult to obtain a dependable reading. The most dependable method to indirectly measure blood pressure is the oscillometric method, but even this has not been proven to be accurate in critically ill children (Park and Menard, 1987). The more reliable method of monitoring is direct intraarterial monitoring.

The insertion of arterial and venous lines also allow for the frequent blood sampling which must be done in the critically ill child. The nurse assists with the insertion of the catheter, ensures accuracy of the transducer and maintains the sterility of the site of insertion. Remember that critically ill children need to have their fluid requirements and administration monitored very carefully to prevent fluid overload. It is better to use a monitoring device specifically designed for children, than to risk potential overload using a device designed for the adult patient. Catheter patency needs to be maintained by the use of a heparinized solution. Butt and others (1987) have established that a heparinized solution works better to positively affect catheter longevity than a specific fluid infusion rate. Blood samples may be taken from heparinized lines if care is taken to withdraw enough to clear the catheter of heparin. Each institution should establish their own policy for this practice, specific to the configuration of the lines used at that institution (Reinhardt and others, 1987).

When actually taking the measurements, the nurse must redefine the zero point of reference in order to have an accurate reading. The reason to have a zero point of reference is to eliminate the atmospheric pressure so that one has an accurate isolated vascular pressure reading. Readings can be taken with the patient in different positions if the relationship between the zero point of the system and the patient's right atrium is kept consistent (Schroeder and Daily, 1989). Once this point is established, all staff needs to use it when taking readings. If the patient's position is changed, the nurse will need to re-zero prior to taking the next reading. The nurse also needs to calibrate both the monitor and the transducer. These are two separate procedures and should be in the Procedure Manual of the specific Intensive Care Unit.

ARTERIAL PRESSURE MONITORING

Measures the systole, valve closure and the diastole. Arterial lines should not be used to administer drugs, blood, etc. They should be used only for fluids. If the transducer is zeroed and the lines are properly prepared, this gives the most accurate blood pressure measurement.

VENOUS PRESSURE MONITORING

Used to measure right arterial pressure to assess blood volume and venous return; to infuse fluids and drugs; and to provide a venous access for blood samples. The line may need to be heparinized if blood samples are going to be drawn from it.

PULMONARY ARTERY PRESSURE MONITORING

Used to manage cardiopulmonary failure. One can obtain measurements of right arterial pressure, pulmonary artery pressure and pulmonary artery wedge pressure. The clinical indications for use of pulmonary artery pressure monitoring include evaluation of the amount of oxygen in a child who is receiving ventilator support; managing vasoactive drugs in the child with myocardial dysfunction; and management of shock (Hazinski, 1992).

CARDIAC OUTPUT

Used to determine myocardial function. Cardiac output should be determined as a method of evaluating whether or not cardiac output is sufficient to meet the metabolic demands of the child which are higher in a traumatic injury situation. Reading should always be placed within the context of the over-all clinical condition of the patient.

RESPIRATORY MONITORING

This is a critical parameter to be monitored in the child. Respiratory distress needs to be identified as soon as possible and appropriate interventions need to be implemented to prevent the child from going into respiratory failure. PULSE OXIMETRY: This is the method of choice for non-invasive monitoring of the oxygen level in arterial blood. This method works better than the transcutaneous method because it responds faster, does not require any calibration and does not add any risks to the patient. (Hazinski, 1992).

OXYGEN ADMINISTRATION

Most traumatically injured children will have oxygen administered from the time treatment begins in the field and will continue to receive this treatment as they progress through the Emergency Department and in the Intensive Care Unit. The Respiratory Therapist will be involved with the patient's care, but the nurse needs to monitor both the system delivering the oxygen as well as the child and the child's response to the oxygen. The oxygen needs to be humidified and warmed and this may lead to the need for frequent linen and clothing changes. Blood gas analysis will need to be done to determine the effectiveness of the oxygen being administered.

MECHANICAL VENTILATION

Assisted ventilation will need to be used for the patient who is in respiratory failure. The traumatically injured child will need to be transported to a facility that has the proper equipment as well as the properly trained staff to provide such care. Manual "bagging" of a child will be necessary until the transport team is present. The child is most likely to be placed on a positive pressure ventilator. The child's size will help to

determine the size of the ventilator to be used. Chest wall stability in the traumatically injured child will also have a bearing on the ventilator chosen. The nurse needs to monitor the child for proper ventilation. Just because the child is on a mechanical ventilator does not mean he/she is receiving proper ventilation.

The child's clinical condition needs to be monitored. If ventilator effectiveness is in doubt, the Respiratory Therapist should be called and the child manually "bagged" until the problem is resolved.

INTRACRANIAL PRESSURE MONITORING

The traumatically injured child with a head injury will usually have invasive monitoring of the intracranial pressure (ICP). This will enable a more detailed assessment of neurological functioning. Increased intracranial pressure indicates an uncompensated increase in intracranial volume. Cerebral perfusion may be compromised if this condition is not treated. A continual non-treatment will result in death of the patient.

The patient who has an intracranial pressure monitor requires some definitive nursing care related to the ICP. The technique of the ICP measurement needs to be standardized. There should be a protocol for this standardization. In addition, the patient is at risk for infection.

Other difficulties with ICP monitoring include catheter obstruction, excessive CSF drainage, obstruction to drainage, fluid and electrolyte imbalances and hemorrhage (Hazinski, 1992). The nurse will need to monitor for each of these possible complications and intervene with appropriate actions.

TEMPERATURE MONITORING

The pediatric Intensive Care Unit patient will need to be monitored as well as his/her environmental temperature. Children may lose heat very quickly. The cold stress leads to increased oxygen consumption and may further distress an already compromised respiratory system. The child's temperature will have to be taken frequently and this may be a distressing procedure for the child. The nurse needs to be prepared to provide a warming device for the hypothermic child.

The nurse caring for the critically ill child needs to focus on the patient, using all of the monitoring devices as adjunct to his/her own skills and observations.

Caring for the traumatically injured child is a special challenge which many nurses find very satisfying. The nursing skills of assessment, planning the child's care (involving parents in the process), implementing the plan of care and evaluating to see what worked and what needs to be adjusted make this process of nursing very worthwhile. Watching the traumatically injured child's condition improve to the point of rehabilitation makes the challenge worth the effort.

ETHNIC, CULTURAL AND RELIGIOUS

Attitudes affect the way the nurse approaches the child and his/her family. Culture is composed of an ingrained orientation to life and it serves as a frame of reference that individuals use to make judgments and decisions. As children are brought up in a specific culture, they learn what to eat, the ideals they will adopt, the appropriate language to speak and the way they are expected to conduct themselves in specific roles. Most children have assimilated their culture by five years of age. Individual resourcefulness, competition, aggressiveness and compliance are all part of cultural norms. The nurse will need to consider those factors in meeting the needs of the child and family. Ethnic influences affect many areas of family life such as structure, moral codes, how families express emotion and interactions with others. Religious factors also affect the perceptions and attitudes of the family and of the patient. Religious differences influence the way families and individuals view their destiny and the destiny of their family members. This may influence decisions made as to the treatment of their loved one.

Table 3.1. Religious beliefs that affect nursing care

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
ADVENTIST (SEVENTH-DAY; ADVENTIST CHURCH OF GOD) Birth: Opposed to infant baptism Baptism in adulthood	Meat prohibited in some groups No alcohol, coffee or tea	Some believe in divine healing and practice anointing with oil and use of prayer May desire communion or baptism when ill Believe in man's choice and God's sovereignty Some oppose hypnosis as therapy	Sabbath: Saturday for many Accept Bible literally
BAPTIST (27 GROUPS) Birth: Opposed to infant baptism Believers baptized by immersion as adults Death: Counsel and prayer with clergy, family, patient	Some groups discourage coffee, tea and alcohol	"Laying on of hands" (some) May encounter some resistance to some therapies such as abortion Believe God functions through physician Some believe in predestination: may respond passively to care	Fundamentalist and conservative groups accept Bible as inspired word of God
BLACK MUSLIM Birth: No baptism Death: Carefully prescribed procedure for washing and shrouding dead	Prohibit alcohol, pork and foods traditional among American blacks (e.g., corn bread, collard greens)	Faith healing unacceptable Always maintain personal habits of cleanliness	General adherence to Moslem tenets overlaid, in many instances, by antagonism to whites, especially Christians and Jews Do not indulge in activities (such as sleeping) more than is necessary to health
BUDDHIST CHURCHES OF AMERICA Birth; No infant baptism Infant presentation Death: Last rite chanting often practiced at bedside soon after death Priest should be contacted	No requirements or restrictions Some sects are strictly vegetarian Discourage use of alcohol and drugs	Illness believed to be a trial to aid development of soul; illness due to Karmic causes May be reluctant to have surgery or certain treatment on holy days Cleanliness believed to be of great importance Family may request Buddhist priest for counseling	Optimistic outlook; teach ways to overcome fears, anxieties, apprehension

Table 3.1. Religious beliefs that affect nursing care (continued)

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
<p>CHURCH OF CHRIST SCIENTIST (CHRISTIAN SCIENCE) Birth: No baptism Death: No last rites</p>	<p>No requirements or restriction</p>	<p>Deny the existence of health crisis, see sickness and sin as errors of mind that can be altered by prayer Oppose human intervention with drugs or other therapies; however, accept legally required immunizations Many adhere to belief that disease is a human mental concept that can be dispelled by “spiritual truth” to extent that they refuse all medical treatment</p>	<p>Many desire services of practitioner or reader; will sometimes refuse even emergency treatment until they have consulted a reader Unlikely to donate organs for transplant</p>
<p>CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS (Mormon) Birth; No baptism at birth Infant is “blessed by church official at first opportunity after birth (in church)” Baptism by immersion at 8 years Death: No special rites but may desire presence of church elders during any acute illness, when condition worsens, when undergoing risky or frightening tests or procedures when feeling sick enough to die or when dying</p>	<p>Prohibit tea, coffee, alcohol Encourage sparing use of meats Fasting for 24 hours on first Sunday each month (from after evening meal Saturday until evening meal Sunday)</p>	<p>Devout adherents believe in divine healing through anointment with oil and “laying on of hands” by church official (elders) Medical therapy not prohibited</p>	<p>Married adults wear special undergarments May request Sacrament on Sunday while in hospital Financial support for sick available through well-funded welfare system Discourage cremation Discourage use of tobacco</p>
<p>ESTERN ORTHODOX (TURKEY, EGYPT, SYRIA, RUMANIA, BULGARIA, CYPRYS, ALBANIA, ETC) Birth: Most believe in infant baptism by immersion 8 to 40 days after birth Death: Last rites obligatory for impending death</p>	<p>Restrictions depend on specific sect.</p>	<p>Anointment of the sick No conflict with medical science</p>	<p>Discourage cremation</p>

Table 3.1. Religious beliefs that affect nursing care (continued)

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
<p>EPISCOPAL (ANGLICAN)</p> <p>Birth: infant baptism mandatory; urgent if poor prognosis</p> <p>Death: Last rites available but not mandatory</p>	<p>Abstain from meat on fast days</p> <p>May fast on Wednesday, Friday, during lent, and before Christmas</p> <p>Some fast for 6 hours before receiving Holy Communion</p>	<p>Some believe in spiritual healing</p> <p>Rite for anointing sick available but not mandatory</p>	<p>Religious icons very important</p> <p>Communion four times yearly: Christmas, Easter, June 30 and August 15, may be mandatory for some</p>
<p>FRIENDS (QUAKERS)</p> <p>Birth No baptism</p> <p>Infant's name recorded in official book</p>	<p>No requirements or restrictions</p> <p>Most practice moderation</p> <p>Avoid alcohol and illicit drugs</p>	<p>No special rites or restrictions</p>	<p>Believe in plain speech and dress</p> <p>Pacifists</p>
<p>GREEK ORTHODOX</p> <p>Birth: Baptism considered important</p> <p>Performed 40 days after birth</p> <p>If not possible to baptize by sprinkling or immersion, church allows child baptism "in the air" moving the child in the form of a cross as appropriate words are said</p> <p>Death: Last rites, administration of Sacrament of Holy Communion</p> <p>Should be performed while dying person is still conscious</p>	<p>Church-prescribed fast periods – usually occur on Wednesday, Friday, and during Lent: consist of avoiding meat and (in some cases) dairy products</p> <p>If health compromised, priest may be contacted to convince family to forego fasting</p>	<p>Each health crisis handled by ordained priest; deacon may also serve in some cases</p> <p>Holy communion administered in hospital</p> <p>Some may desire Sacrament of the Holy Unction performed by priest</p>	<p>Oppose euthanasia</p> <p>Believe every reasonable effort should be made to preserve life until termination by God</p> <p>Discourage autopsies that may cause dismemberment</p> <p>Prefer burial to cremation</p>
<p>HINDU</p> <p>Birth: No ritual</p> <p>Death: Special prescribed rites</p> <p>Priest pours water into the mouth of dead child, ties a thread around neck or wrist to signify blessing (should not be removed)</p> <p>Family washes body and is particular about who touches body</p>	<p>Many dietary restrictions</p> <p>Beef and veal not eaten</p> <p>Some strict vegetarians</p>	<p>Illness or injury believed to represent sins committed in previous life</p> <p>Accept most modern medical practices</p>	<p>Cremation preferred</p>

Table 3.1. Religious beliefs that affect nursing care (continued)

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
<p>ISLAM (MUSLIM/MOSLEM) Birth: No baptism Death: Patient must confess sins and beg forgiveness before death; family should be present Family washes and prepares body, then turns it to face Mecca Only relatives and friends may touch body</p>	<p>Prohibit all pork products and any meat that is not ritually slaughtered Daylight fasting practiced during ninth month of Muhammadan year (Ramadan) Strict Muslims do not use alcohol or mind-altering drugs</p>	<p>Faith healing not acceptable unless psychologic condition of patient is deteriorating; performed for morale Ritual washing after prayer; prayer takes place five times daily (on rising, mid-day, afternoon, early evening and before bed); during prayer, face Mecca and kneel on prayer rug</p>	<p>Older Muslims often have a fatalistic view that may interfere with compliance to therapy May oppose autopsy</p>
<p>JEHOVAH'S WITNESS Birth: No baptism Death: No last rites</p>	<p>Eat nothing to which blood has been added: can eat animal flesh that has been drained</p>	<p>Adherents are generally absolutely opposed to blood transfusions, including banking of own blood; individuals can sometimes be persuaded in emergencies May be opposed to use of albumin; globulin, factor replacement (hemophilia vaccines)</p>	<p>Often possible to obtain a court order appointing a hospital official as temporary guardian to consent to child's transfusion when parents refuse consent Autopsy approved only as required by law</p>
<p>JUDAISM (ORTHODOX AND CONSERVATIVE) Birth: No baptism Ritual circumcision of male infants on eighth day; performed by Mohel (ritual circumciser familiar with Jewish law and aseptic technique) Reform Jews favor ritual circumcision, but not as a religious imperative Death: Remains are ritually washed by members of the Ritual Burial Society Burial should take place as soon as possible</p>	<p>Numerous dietary kosher laws exist that may be influenced by local practices and family and cultural tradition Allowed only meat from animals that are vegetable eaters, are cloven hoofed, chew their cud and are ritually slaughtered; fish that have scales and fins Prohibit any combination of meat and milk; milk products served first can be followed by meat in a few minutes, but milk may not be consumed for several hours after eating meat Fasting for 24 hours is part of Yom Kippur observance Matzo replaces leavened bread during Passover week</p>	<p>May resist surgical procedures during Sabbath, which extends from sundown Friday until sundown Saturday Seriously ill and pregnant women are exempt from fasting Illness is grounds for violating dietary laws (e.g., patient with congestive heart failure does not have to use kosher meats, which are high in sodium)</p>	<p>Oppose all forms of mutilation, including autopsy, body parts not donated or removed; amputated limbs, organs or surgically removed tissues should be made available to family for burial Donation or transplantation of organs requires rabbinical consent May oppose prolongation of life after irreversible brain damage</p>

Table 3.1. Religious beliefs that affect nursing care (continued)

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
LUTHERAN BIRTH: Baptize only living infants shortly after birth Death: Last rites optional	No requirements or restrictions	If grave prognosis, family may request anointing and blessing of sick or visit by church official	Accept scientific developments
MENNONITE (SIMILAR TO AMISH) Birth: No baptism in infancy Baptism during early or middle teens	No requirements or restrictions	No illness rituals Deep concern for dignity and self-determination of individual that would conflict with shock treatment or medical treatment affecting personality or will	
METHODIST Birth: No baptism at birth; performed on children or adults Death: No ritual	No requirements or restrictions	Communion may be requested before surgery or similar crisis	Encourage donation of body or body parts to medical science
NAZARENE Birth: Baptism optional Death: No last rites	No requirements or restrictions Alcohol prohibited	Church official administers communion and laying on of hands Adherents believe in divine healing but not exclusive of medical treatment	Cremation permitted
PENTECOSTAL (ASSEMBLY OF GOD, FOUR-SQUARED) Birth: No baptism at birth Baptism by complete immersion after age of accountability Death: No last rites	Abstain from alcohol, eating blood, strangled animals or anything to which blood has been added Some individuals may resist pork	No restriction regarding medical care Deliverance from sickness is provided for in atonement; may pray for divine intervention in health matters and seek God in prayers for themselves and others when ill	Some insist illness is divine punishment; must consider it an intrusion of Satan Practice glossolalia (speaking in tongues)
ORTHODOX PRESBYTERIAN Birth: Infant baptism by sprinkling Death: Last rites not a sacramental procedure; scripture reading and prayer	No requirements or restrictions	Communion administered when appropriate and convenient Blood transfusion accepted when advisable Pastor or elder should be called for ill person Believe science should be used for relief of suffering	Full forgiveness granted for any illness connected with a sin

Table 3.1. Religious beliefs that affect nursing care (continued)

Beliefs about birth and death	Beliefs about diet and food practices	Beliefs regarding medical care	Comments
<p>ROMAN CATHOLIC Birth: Infant baptism mandatory; especially urgent in poor prognosis, when it may be performed by anyone Death: rite for anointing of the sick is mandatory Family or patient may request anointing if prognosis is grave</p>	<p>Fasting and abstaining from meat mandatory on Ash Wednesday and Good Friday; fasting optional during Lent; no meat of Fridays during lent as general rule Children and most hospital patients exempt from fasting (eating only one full meal and no eating between meals) Some older Catholics may adhere to older rule of no meat on Friday</p>	<p>Encourage anointing of sick, although this may be interpreted by older members of church as equivalent to the old terminology "extreme unction" or "last rites"; they may require careful explanation if reluctance associated with fear of imminent death Traditional church teaching does not approve of contraceptives or abortion</p>	<p>Family may request that major amputated limbs be buried in consecrated ground Transplant accepted as long as loss of organ does not deprive donor of life or functional integrity of body Autopsy acceptable Religious articles important</p>
<p>RUSSIAN ORTHODOX Birth: Baptism by priest only Death: Traditionally after death arms are crossed, fingers set in a cross</p>	<p>No meat or dairy products on Wednesday, Friday and during Lent</p>	<p>Cross necklace is important and should be removed only when necessary and replaced as soon as possible Adherents believe in divine healing, but not exclusive of medical treatment</p>	<p>Opposed to autopsy, embalming or cremation</p>
<p>UNITARIAN UNIVERSALIST Birth: Some practice infant baptism; most consider it unnecessary Death: No ritual</p>	<p>No requirements or restrictions</p>	<p>Believe God helps those who help themselves Some may prefer not to have clergy visit them in hospital</p>	<p>Cremation preferred to burial</p>

Source: Carpenito, 1992, Conley 1990: Koizer and Erb, 1987, Spector, 1985; personal communications.

[Click Here for Table 3 - 2](#) CULTURAL CHARACTERISTICS RELATED TO HEALTH CARE OF CHILDREN

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Course Test

CHOOSE THE **ONE BEST** ANSWER:

1. The number of deaths in children ages one to fourteen caused by traumatic injuries is:
 - a. One million
 - b. 22,000 to 25,000
 - c. 25 million
 - d. 100,000

2. Common areas for accidents to happen to children include:
 - a. The home
 - b. The streets
 - c. Schools
 - d. All of the above

3. Choose one of the most common type of traumatic accidents in children ages six to twelve years of age:
 - a. Falls down stairs
 - b. Falls from monkey bars
 - c. Bicycle accidents
 - d. None of the above
4. Choose one of the most common types of traumatic accidents in children ages one to three:
 - a. Falls down stairs
 - b. Falls from monkey bars
 - c. Vehicular accidents
 - d. None of the above
5. Nurses can aid in the prevention of traumatic injuries in children by educating parents to the following:
 - a. Insist that their children wear helmets when riding bicycles
 - b. Review traffic laws with their children
 - c. Supervise children even when they are busy
 - d. All of the above
6. Head injuries in children are common because:
 - a. In a child the head is proportionately large for the size of the child
 - b. A child has poor balance
 - c. The child frequently becomes a projectile with the head at the front of the projectile
 - d. The bones are not well developed
7. A scale which is used to evaluate the severity of injury is called:
 - a. The Patterson Index of Severity
 - b. The Glasgow Coma Scale
 - c. The Trauma Center Scale for Traumatic Injuries
 - d. Reynolds Scale of Injury
8. One of the primary causes of death in a traumatically injured child is:
 - a. Head injury
 - b. Airway compromise
 - c. Blood loss
 - d. Internal injuries
9. When estimating blood loss in the injured child the nurse needs to monitor the following:
 - a. Blood pressure
 - b. Capillary refill
 - c. Peripheral pulse rates
 - d. All of the above

10. When administering IV on an injured child, it is important for the nurse to:
 - a. Carefully calculate the IV
 - b. Make sure that the output is also measured
 - c. Use appropriately sized equipment
 - d. All of the above

11. In a Trauma Center, the leader of the Trauma team is most often the:
 - a. Anesthesiologist
 - b. Radio nurse
 - c. Respiratory therapist
 - d. Trauma surgeon

12. When stabilizing the injured child "in the field", one of the prime considerations of the field personnel is:
 - a. Notification of parents
 - b. To prevent or reverse any effects of hypoxia
 - c. Prevention of exposure
 - d. Arranging transportation

13. The field personnel also need to stabilize the:
 - a. Cervical spine
 - b. Chaos at the scene
 - c. Child's blood pressure
 - d. Child's temperature

14. The nurse in the Trauma Center will usually be assigned to do the following during a trauma resuscitation:
 - a. Intubate the child
 - b. Set up the ventilator
 - c. Take vital signs
 - d. Take the cervical spine X-rays

15. The pediatric trauma patient should always be transported:
 - a. By helicopter
 - b. To the nearest hospital
 - c. To the designated trauma center
 - d. To the hospital indicated by the parents.

16. Family members should:
 - a. Be transported with the child
 - b. Be allowed to see the child before transport
 - c. Go with the police to the trauma center
 - d. None of the above

17. Cervical spine immobilization should occur:
- In the Emergency Department
 - In the Transport Vehicle
 - At the scene
 - In Radiology after X-rays
18. Signs of airway obstruction include:
- Stridor
 - Loud, high pitched cry
 - Tachycardia
 - Hypovolemic shock
19. If airway obstruction is present, the nurse needs to monitor for adequate ventilation. If ventilation is not adequate, the nurse should anticipate:
- The initiation of a ventilator
 - Immediate surgical intervention
 - Opening the chest
 - An MRI
20. After the initial interventions are implemented, the nurse will do another assessment. One of the purposes of this assessment is to:
- Reassure the patient
 - Evaluate the patient's response to the initial resuscitative efforts
 - Determine any orthopedic injuries
 - Review injuries with the parents
21. When a child has a Modified Glasgow Coma score of less than eight, the nurse can anticipate that the patient will:
- Die
 - Go to Radiology for a CAT Scan
 - Be discharged
 - Be transferred to another Trauma Center
22. The MRI is not usually used with an unstable patient because of the difficulty in providing:
- Adequate transportation
 - Resuscitative measures if needed
 - Adequate visualization of the patient
 - Adequate fluids to the patient
23. One of the most common types of injuries seen in children is:
- Cervical spine
 - Closed head injury
 - Fractured ribs
 - Penetrating abdominal injury

24. When the nurse is evaluating musculoskeletal injuries, he/she needs to report the following:
- Absence of pulses in the extremity
 - Protrusion of bones
 - Diminished capillary refill
 - All of the above
25. A bruise with bleeding into the soft tissues is a:
- Strain
 - Contusion
 - Fracture
 - Subluxation
26. An excessive stretching of the muscle beyond its capacity is called a:
- Strain
 - Contusion
 - Fracture
 - Subluxation
27. An injury in the tendon or ligament around the joint is called:
- Sprain
 - Contusion
 - Fracture
 - Subluxation
28. When a bone is partly dislocated from the joint it is described as a:
- Sprain
 - Contusion
 - Fracture
 - Subluxation
29. When the nurse is caring for a burn patient, it is important to focus on which of the following:
- Fluid and heat loss
 - Chest injuries
 - Extremity injuries
 - Level of consciousness
30. The functions of the skin include which of the following:
- Thermoregulation
 - Fluid and electrolyte balance
 - A protective barrier
 - All of the above
31. The severity of a child's burn is determined by:
- The amount of pain
 - Amount of skin burned and the depth of the burn
 - The intensity of the burn
 - The amount of smoke inhalation

32. The definition of child abuse includes which of the following:
- Physical and emotional mistreatment
 - Neglect of children
 - Sexual abuse and/or sexual exploitation
 - All of the above
33. The person(s) most likely to commit child abuse are:
- Grandparents
 - School teachers
 - Parents
 - Strangers to the family
34. The tendency to be a child abuser can be:
- Inherited from parents
 - Learned from parents
 - Only documented among low income parents
 - Only found in America
35. The possibility of child abuse should be considered when:
- There is a delay in seeking treatment
 - The child names an adult as having caused the injury
 - The explanation of the injury is not consistent
 - All of the above
36. When a toddler is in the Intensive Care Unit, it is important that parents:
- Only visit at specified times so the child will adjust
 - Be at the bedside at all times if possible
 - Not ask questions in front of the child
 - All of the above
37. As the Pediatric Intensive Care Nurse is assessing the child he/she needs to pay close attention to the following:
- Color
 - Skin temperature
 - Activity levels and responsiveness
 - All of the above
38. When preschool children are in pain, they may:
- Become lethargic and pale
 - Be hyperactive
 - Be very hungry
 - Ask lots of questions
39. When adolescents are seriously injured they will:
- Want all of their friends to visit
 - Want detailed explanations of procedures
 - Not want to see anyone
 - Be hyperactive

40. Some ways of providing a positive growth environment for children in Intensive Care include:
- Sound stimulation appropriate to the age of the child
 - Pictures of family members
 - Favorite toys
 - All of the above
41. If the eight month old child turns and ignores parents when they come into the Intensive Care unit the nurse should recognize that the child is in which of the following stages of separation anxiety:
- Protest
 - Denial
 - Despair
 - Anger
42. When a loved one is injured, family members are under stress. The nurse needs to remember that persons under stress:
- Have a decreased ability to problem-solve
 - May focus only upon the child, neglecting themselves
 - Feel lost, out of control
 - All of the above
43. Symptoms of possible pain which the nurse should be aware are;
- Irritability, restlessness, agitation
 - Flaccidity of the injured part
 - Decreases in blood pressure and heart rates
 - All of the above
44. The child with a head injury should be periodically assessed for the following:
- Level of consciousness
 - Adequate systemic perfusion
 - Pupil size and response to light
 - All of the above
45. When the nurse observes a seizure in the child he/she needs to:
- Document it
 - Report it to the physician
 - Provide for the safety of the child
 - All of the above
46. Head injuries in children include the following:
- Pericardial tamponade and pneumothorax
 - Epidural hematoma and concussion
 - Subluxation and flail chest
 - Dislocation and sprain

47. Penetrating chest injuries in a child are usually caused by;
- Vehicular accidents
 - Beatings
 - Knives or bullets
 - None of the above
48. Traction applied to the child will be one of the following:
- Either pelvic or bucks traction
 - Either skin or skeletal
 - Continuous or passive
 - Active or intermittent
49. Planning for rehabilitation of the child should occur:
- As soon as possible after the injury
 - Three days before discharge
 - Only as the physician directs
 - Only if the family has sufficient income
50. When planning intensive care for children, it is important that the nurse make sure that the equipment to be used on the children is:
- The most recent available on the market
 - The correct size for children
 - Inservice when a child is admitted
 - Cleaned daily