Managing the patient and parents in dental Practice. Local Anesthesia

The concept of treating the patient and not just the toth should be operative with al patients, but is esential with the child patient. The dentist who fails to attend to the psyhological needs of the children will soon deal with unco-operative patient. Mistakes made by the dentist are often hidden by the stoic nature of the adult patient or by the subsequent failure of the payient to return. The effects of errors made with the child not only have to be faced immediately, but often have to be dealt with subsequently when the child returns unwillingly.

T*wo year old.* At two years of age children differ greatly in their ability to communicate, primarly because there is considerable difference in the development of their vocabulary at that age. The vocabulary at age 2 may vary from 12 to 1000 words. The two yaer old child is often referred to as being in the !preco-operative stage”. Solitary play is prefered because the child has not yet learned to play with other children. The child is too young to be reached with words alone and must handle and touch objects in oder to grasp their meaning fully. The young child fears falling or sudden unexpected movements. Suddenly being lowered or being tilted back in the dental chair without warning will arouse fear. Quick jerky movements of the hands are frightening. Bright lights are feare producing. Separating this young child from the parents is extremely dificalt, and almost without exception the 2-year-old should be accompaned by parent to the treatment room.

Three-year-old. The 3-yaer-old child is one with whom the dentist can usually communicate more easly. The child has a great desire to talk and will often enjoy telling stories to the dentist. At this stage the dentist personnel can begin to speak positively rather than negativly to children at any age. This is paticilary true with the young child, who is apt to do the things he or she is told not to do.

*Four-year-old.*The four-year-old child usually listen with interest to explanations and normally is responsive to verbal directions. The four-yaer-old child is usually a good dental patient. Chldren at this age usually have lively minds and may be great talkers, although they tend to exaggerate in their conversation. In some situations the 4-year-old may become defiant. Fear of strangers, which is most intense between 2 and 3 yaers of age, is lessened age 4. One fear that may become rather general is that of bodily injury. Sometimes a child at this age will ”go to pieces” from a minor injury. The prick of a hipodermic needle or sight of blood following a tooth extraction may produse a response disproportionate to the degree of pain.

*Five-year-old.*The five-year old has reached an age readiness to accept group activities and community experience. A 5-yaer-old propely prepared by rhi patens has little fear of being separated from the parents for the dental appointment. The children in this age group are usualy proud of their possessions. Comments about clothes can often be effectively used establishing communication with a new patient.

*Six to twelve-yars-olds.*The period from six to about twelve of age the child learns about the outside world and become increasingly independent of the parents. There are years when closely knit groups are formed such as child and gangs. They are importent years for learning how to get along with other people and to abide by the rules of sociaty. The child also has learned to tolerate unpleasant situations and has marked desires to be obedient, carrying frustrations well.

The behavior of children in the dental environment. The dentist examining a child patient almost aloways assesses one aspect of behavior-co-operativness. Clinicians characterize children in one of there ways: cooperative, lacking in co-operative ability, or potentially co-operative.

Co-operative. Most children seen in dental office are co-operative. They are resonably relaxed and have minimal apprehensions. They have good raport with the dentist and are interestedin the dental procedures, often laughing and enjoyingthe situation. When guideline for their behavior have established, these children perform within the provided framework. They present a ”reasonable level” of co-operation, which alows the dentist to function effectivly and efficiently.

Lacking co-operation ability. In contrast to the co-operative child lacking co-oprtative ability. This category include very young children (less than 2 yaers) whom communication cannot be established. Because of their age they lack co-operative abilites. They can pose major behavioral peoblems. This children have been reffered to as being in the preco-operative period.

A second group of children who lack co-operative ability are those with specific debilitating or handcapping conditions. The severity of their conditions prohibitis co-operation in the usual manner. More and more of thise special children are being seen in dental office today.

Potentially co-operative behavior. The terminology generally to the potentially co-operative child is ” behavior problem”. This child differs from a child lacking co-operative ability in child able to co-operate. When characterized a potentially co-operative, the judgment is that the child„s behavior can be modified. Thise potentially co-operative children are caracterized in the following sections.

Uncontrolled behavior. When ancontrolled behavior reaction occurs it is usually seen in the young child, age 3 to 6. The reaction, a form of tantrum, may begin in the recetion area or even before the child enters the dental office. This behavior has also been labeled ”incorrigible”. It is caracterized by tears, loud crying, physical lashing out, and failing of the hands and legs. All are suggestive of a state of acute anxiety or fear. School-age children tend to model their behavior that of adults or older children. Uncontrollable, immature behavior would not be consistent with their self-concept. If it does occur in the old child, there are probably deep-rooted reasons for it. At attempt to understand the reasons may reveal adjustment problems in other settings.

Defiant behavior. Although defant behavior can be recognized in children of all ages, it is more tipical in the elementrary school group. To some extent behavior is controlled. It is distinguished by ”I don’t want to”, “ I don’t want to”, “I won’t”. When brought to the dental office against their will, they protest as they would at home. Children exhibiting this type of behavior have been reffered to as „stubborn” or „spoild”. Guidelines for their behavior should be established. Once won over, these children frequently become highly co-operative. The dentist must first, however, „call their bluff”.

Defiance can be passive as well and most often encountered in the older children approaching adolescence. The youngester slumps in the chair and refuze to respond verbally. When the dentist ettemps to involve the child in the procedure, failure of communication results. When an intraoral examination is attempted, the patient may reject the situation by clenching the theeth.

Timid behavior. Compared to those behavioral forms already discussed timidity is milder. If these children are managed incorrectly, their behavior can deteriorate to uncontolled. The timit child may shield behind a parent. They usually fail to offer great physical resistance to the separation procedure. Some may stall or hesitate when given directions. They may whaper but wil not cry hysterically. Occasionaly, they lift their hands to their eyes to cry but without tears. Many reasons may exist for timidity reactions. A child may come from an overprotective home environment. They may live in an isolated area and have little contact with strangers. Often children are awed by strange surroundings. This type of child needs self-confidence and confidence in the dentist and must be carefully led through the experience. Timid child are highly anxious. They do not always hear or comprehend instructions. The dental team should understand that guidelines prezented to timid children often must be repetead because of their emotional state.

Tense-Co-operative behavior. The behavior of some children is boredeline. Typiclly, these children accept treatment are extremely tense. The term „tense-co-operative” has thus been coined. A tremor may be heard when they speak. They may perspire noticeably on the palms of the hands or brow. Because they control their emotions, the busy or unobservant practitioner fails to see a problem. These children may grow up accepting dentistry, but dislike out of proportion to their personal experience.

Whining behavior. Some children have been ddescribed as whiners. They could be in either of the two previously described groups of potentially co-operative children. However, since whining plays a prominent part in their performance, their behavior can be decribed as a dentist entity. Whining children allow the dentist to procced but whine throughout the entire procedure despite encouragements. They frequently complain of pain. The cry is controlled, constant, and not paticulary loud. Seldom are their tears. Sich children can be exasperating. Their continuing reactions are a source of frustration and irritation to those involved with the treatment. Great patience is reuired when dealing eith whining children.

Frankl's categories of behavior. Rating I. Definitely negative. Refusal of treatmen, crying forcefully, fearful, or any other evidence of extrem negativism. Rating II. Negative. Relictant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, i.e. sullen, withdrawn. Rating III. Positive. Acceptace of treatment; at times cautions, willingness to comply with the dentist, at times with reservation but patient follows be dentist's directions cooperatively. Ratig IV. Definitely pozitive. Good raport with the dentist, interested in the dental procedures, laughing and enjoying the situation.

Local anesthesia for the child and adolesent

It is generaly agreed that one of the most important aspects of child behavior guidance is the control of pain. If children experience pain during restorative or surgical proceduries, their future as dental patient may be demaged. Therefore it is important at each visit to reduce discomfort to a minimum and to control painfull situation.

Since there is usually some discomfort associatd with the procedure, a local anesthetic is usually indicated when operative work is to be performed on the permanent teeth and same is true of cavity preparation in primary teeth. Dental procedure can be carried out more effectively if if the child is comfortable and free pain. Even the youngest child treated in the dental office normally presents no contraindications for the use of a local anesthetic.

*Mode of action of local anesthetics.*Several theories on the mode of action of local ansthetics have been proposed. The most widely accept theory states that local anesthetics solutions prevent the normal passage of ions through the nerve membrane, thus preventing the conduction of nerve impulses. In the nerve fibers the intracellular fluid is separated from the extracellular fluid by a lipoprotein membrane. The inside of the resting nerve membrane is negativly charged as compared to the positively charged outside. The transmembrane potential differnce is approximately – 70mV (resting potential). Concentration gradients between the intracellular fluid containing potassium, the major cation, and the extracellular fluid contaning sodium are maintaned by an active metabolic process.

When a stimulus occues, the voltage across the membrane reaches approximately – 40mV or - 55mV, and the firing threshold of the nerve is attained. This triggers a partial depolarization with an increase in membrane permeability to sodium occurring. The enty of sodium ions creates less negativity on the inferior of the nerve membrane, and the action potential os generated. During the early repolarization stage, the inferior of the membrane is approximately +40 or +50mV, than the membrane rapidly becomes less permeable to sodium and the nerve returns to the resting site, ready to repear the process. If the nerve is again stimulated before the resting potential equilibrium is reestablished, there can be no transmission of second impulse. This procces of depolarization and repolarization repeats itself along the lengh of the nerve fiber.

The addition of local anesthetics stabilizes the nerve membrane blocking the normal passage of iones throuth the membrance. Two theories on the interaction of local anesthetics with the nerve membrane have been proposed. One theory (surface change theory) is that anesthetics may increase the binding of calcium to the nerve membrane. Calcium is normally displaced from yhe membrane during impulse transmissing allowing increased access of sodium ions. A second theory (membrane expansion theory) is that local anesthetics bind to receptors on the membrane and this binding increases membrane stability and prevents the opening of channels for the passage of electrolytes.

Local anesthics have been demonstrated to affect normal nerve transmission by the following: increasing the threshold for electrical exitation in the nerve; lowering the hegiht of the action potential; reducing the rate of rise of the action potential; slowing the propagation of impulse conduction. All of this progress until the membranestabilizes at the resting potential, evntually blocking contuction.

The molecular configuration of the local anesthetics are commonly divided into three components. The hydroplic amide component provides the local anesthetic the potential diffusability through interstitial fluid to arrive at the nerve. The lipophilic aromatic component provides the potential for the local anesthetic to penetrate the lipidrich membrane. The intemediate-chain component determines if the local anesthetic is an amide or ester. Amide local anesthetics (lidocaine, mepivacine) are detoxified in the liver, whereas ester local anesthetics (procaine) are metabolized by the plasma enzyme cholinesteraze.

Local Anesthetic Technique for pediatric Dentistry. Local anesthesia is the elimination of senzation, incuding pain, in ona part of the body by the topical applicatin or injction of a drug. The safety of any pharmacologic pain control technique depends on the health status of the patient, the inherent toxity of the agents used and the competence of the clinician. The successful administration of a local anesthetic to a child must begin with a through knowledge of the drugs that will be used, including the appropriate dose on a milligram per pound kilogram basis.

The most commonly used local anesthetics for pediatric dentistry are the amide-type drugs. Lidocaine HCL 2% (Octocaine or Xylocaine) with 1:100.000 epinephrine. Mepivocaine HCL 2% (Carbocaine or Polocaine) with 1:20.000 levonondefrin (Neo-Cobefrin). Mepivocaine HCL 3% (Carbocaine or Polocaine). Prilocaine HCL 4% (Citanest). Prilocaine HCL 4% (Citanest Forte) wirh 1:200.000 epiinephrine.

Lidocaine hydrochloride is metabolized mainly in the liver an excreted via the kidnays. When used a 2% solution with 1:100.000 epinephrine for infiltration anesthesia, the onset of action is usualy less than 2 minutes. Duration for pulpal anesthesia is 60 minutes and for soft tissure anesthesia about 2.5 hours. When used for nerve block anesthesia, the onset is about 2 or 4 minutes, and duration is about 90 minutes for pulpal anesthesia and 3 to 5 hours for soft tissure anesthesia.

Mepivacaine hydrochloride is rapidly metabolized by the liver with only about 5% to 10% excreted in the urine. When used in a 3% solution without a vasoconstrictor for infiltration anesthesia, onset is 30 to 120 second and duration is about 20 minutes. When a vasoconstrictor is used, duration is 1 to 2.5 hours for infiltration anesthesia and 2.4 to 5 hours for nerve block anesthesia.

There have ben several reports of morbidity related to the use of mepovicaine in children. This may be related to the higher concentration (3%) in with it is packaged and the fact that the practitioners were not aware of the greater unit dose. Whatever the reason, additional caution is recommended when administering mepivocaine to very young children, especially when it is used in 3% concentration wiyhout a vasoconstrictor.

Prilocaine hydrochloride is an amide type local anesthetic that is metabolized by the liver and the kidney and excreted via the kidness. The argent is not metabolized by the plasma esterastes and has been found to produce methemoglobinemia. It should be used with additional caution in children.

Local anesthetics: Maximum allowable dose recommended for children

2% Lidocain (Xilocaini, Octacaini) 20 mg/ml, 2.0 mg/1b 300 mg max 2% Lidocain cu 1:100 000 epifedrin 20 mg/ml, 3,0 mg/1b 450 mg max		
Weith in pounds	Lidocaini2% with 1.100000 epifedrine	
20	60 mg	1.5 carpule max
40	120 mg	3.0 carpule max
60	180 mg	5.0 carpule max
80	240 mg	6.5 carpule max
100	300 mg	8,0 carpule max
150	450 mg	12,5 carpule max
3%Mepivecaini (Crbocaini, polocainia) 30 mg/ml 2.0mg/1b 300 mg max 2%Mepivecaini with 1:20000 Neo-Copefrin 20 mg/ml 3.0mg/1b 400 mg max		
Weight in pounds	Carbocaini 3%	Caarbocaini 3% cu 1:20000 Neo-Cobefrin
20	40 mg 0,75 carpule max.	60 mg 1,75 carpule max..
40	80 mg 1,00 carpule max.	120 mg 3,00 carpule max.
60	120 mg 2,25 carpule max	180 mg 5,0 carpule max.

80	160 mg 3,00 carpule max	240 mg 6,50 carpule max.
100	200 mg 5,50 carpule max	300 mg 8,00 carpule max
150	300 mg 5,50 carpule mx	400 mg 11,00 carpule max
4%Prilocaini (Citanest) (40mg/ml) 3.0mg/ml3.0mg/1b 500 mg max 4%Prilocaini (Citanest Forte) (40mg/ml) 4.0mg1b 600 mg max		
Weight in pounds	Citanest 4%	Citanest Forte 4%
20	60 mg 0,75 carpule max.	80 mg 1,00 carpule max..
40	120 mg 1,50 carpule max.	160 mg 2,00 carpule max.
60	180 mg 2,50 carpule max.	240 mg 3,25 carpule max.
80	240 mg 3,25 carpule max.	320 mg 4,25 carpule max.
100	300 mg 4,00 carpule max	400 mg 5,50 carpule max.
150	450 mg 6,00 carpule max	600 mg 8,00 carpule max.

When used with or without a vasconstrictor, the onset for infiltration anesthesia averages less than 2 minutes, and duration for pulpal anesthesia is about 5 t 20 minutes and about 1 to 2 hours for soft tissure anesthesia. For nerve block anesthesia the duration for pulpal anesthesia is about 1 hour and about 2 to 4 hours for soft tissure anesthesia.

There is no perfect technique that guarantees successin anesthetizing all children, but there are a few techniques that can quarantee many failures. These four mistaes are the most common errors made by dentists when attempting to anesthetize a child:

1. Waving the needle in front of the child.
2. Not getting firm control of the patients's head and hands.
3. The use of long needles.
4. The use of inappropriate doses for children.

Injection of local anesthetics should be made slowly, preceded by aspiration to avoid intravascular injection and systemic reatcions to the local anesthetic or vasoconstricter. Local anesthetic drugs in use are extremeley safe, and allergic reactions are very rare. The most frequently observed advers reactions are due to overdoses. The recommended safe doses are about 1 ½ times higher with a vasoconstrictor than without. The rationale is that the vasoconstrictor decreeases the rate of absorption into the circulatory system, thereby lowering the peak blood levels at a given dose. This is particulary true for anesthetics that are vasodilators, such as lidocaine. Local anesthetics may cause stimulation of the central nervous system, perhaps due to delective depression of inhibitory neurons, producing restlessness and tremor and in overdose, possibly clonic convulsions. In general the more potent the anestethic the more readily convulsions may be produced. Central stimulation is followed by depression, and death is usually due to respiratory failure. In combination with sedative drugs, local anesthetics may have an addditive CNS-depressnt effect. Toxic reaction to local anesthetics occur more frequently when they are in combination with other sedative drugs, espacially when used in comjunction with narcotics.

Young children should receive diminished doses of each agent when used together.

Topical anasthetics.The primary goal when used the topical anesthetics is to minimize the senzation of needle penetration into the soft tissue, or to help the patient to prepare himself for the coming injection. Because of the high concentrations necessery for effect by the commonly used topical anesthetics, and their rapid absorbtion into the cardiovacular system, one must aply the agent carefully to only a small area of the mucosa, so as not to overdose very small children, (the unit dose is 0.25ml). When topical anesthetics are used, they must be placed on dried mucosa and left in place at least for one minute, and preferably longer, to achieve maximum efect. A cotton swab works quite well for such application. Topical anesthetics are available in gel, liquid, ointment, and pressurized spray forms. However the pleasent-tasting and quick acting liquid gel or ointment preparations seen to be preferred by most dentists. The onset of action of benzocaine is about 30 seconds, tetracaine about 60 seconds, and lidocaine about 3-5 minutes. A variety of anesthetic agents have been used in topical anesthetic preparations, including ethyl aminobenzoat, butacaine sulfate, cocaine, dyclonine, lidocaine, and tetracaine.

Lidocaine is available as Xylocaine in a 10% (100mg/ml) spray and 5% (50mg/ml) liquid, ointment and viscous solution. Its onset is about 3 to 5 minutes.

The incidence of adverse effects, such as the irritation and swelling of tissues and allergy is reportedly lower with lidocaine than with other topical agents.

Benzocaine is an ester-type local anesthetic available as Hurricaine gel and solition 20% (200mg/ml), as well as several other proprietary preparations. The recomended unit dose is about 0.25 ml. It is absorbed rapidly through the oral mucous membranes and has a lower potential for toxicity then the other topical anesthetics. Onset is about 30 seconds. Benzocaine is probably rhe best topical anesthetic for use in pediatric dentistry.

Tetracaine is not recommended for use in pediatric patients because of its high toxicity. It is a very potent ester-type local anesthetic, which is 10 timesmore potent and 10 times more toxic than procaine. Tetracaine is available as Cetilyte liquid and ointment 2% (20mg/ml). Onset is about 60 seconds.

Fundamental differences in children.

There are fundamintal differences in children that make the administration of local anethetics to children different from that of adults. The obvious difference, of corse, is the size of the 20-pond child as compared to the 200-pound adult. The child is not merely a small adult. The bone in the child is less dense and generally less calcified and, in the area of the primary dentition, contains the permanent tooth buds. Because of buds adiquate operative anesthesia can frequently be obtained in many areas by local infiltration anesthesia, utilizing relativly small amounts of anesthetic solution.

The primary molars are the predecessors to the permanent bicuspids, and as such they should be anesthetized in the same manner. Because of this, the posterior palatine injection has little place in anesthetizing primary molars. Vestibular infiltration, combined with interpapillary infiltration, which includes the lingual tissure, is quite adequate and avoids the unnecessary pain associated with the palatal injection. The interpapillary injection should follow the buccal infiltration by about 3 to 5 minutes to minimize the paine of the second injection.

Anasthetizing maxillary primary and permanent incisors and canines. *Supraperiosteal technique (local infiltration).* Local infiltration (supraperiosteal technique) is used to anesthetize the primary anterior teeth. The injection should be made closer to the gingival margin than in patient with permanent teeth, and the solution should be deposited close to the bone. After a needle tip has penetreted the soft tissue at the mucobuccal fold, it needs little advancment before the solution is deposited (2 mm at most) because the apices of the maxillary primary anterior teeth are essentially at the level of the mucobuccal fold. Some dentist prefer to „pull" the upper lip down over the needle tip to penetrate the tissue rather than the needle upward. The approach works quite well for the maxilary anterior region. In anesthetizing of the permanent central incisor teeth the pucture site is at the mucobuccal fold, so that the solution may be deposited slowly and slightly above and close to the apex of the tooth. Since there may be nerve fibers extending from the pposite side, it may be necessary to deposit a small amount of the anesthetic solution adjacent to the apex of the other central incisor to obtain adequate anesthesia in either primary or permanent teeth. If a rubber dam is to be applied, it is advisable to inject a drop or two of anesthetic solution into the lingual free marginal tissue to prevent the discomfort associated with the placement of the rubber dam clamp and ligatures.

Before extraction of the incisors or canines in either the primary or permanent dentition, it will be necessary to anesthetize the palatal soft tissues. The nasopalatine injection will provide adequate anesthezia for the palatal tissue of the all four incisors and at least partial anesthesia of the canine areas. Nerve fibers from the greater (anterior) palatine nerve usually extend to the canine area as well. If only a single anterior tooth is to be removed, adequate palatal anesthesa may also be obtained when anesthetic solution is deposited in the attached palatal gingiva adjacent to the tooth to be removed. If it is observed that the patient does not have profound anesthesia of anterior teeth during the operative procedures with the supraperiosteal technique a nasopalatine injection is advisable.

Anesthetizing maxillary primary molars and premolars. Traditionally dentists have been taught that the middlr superior alvelar nerve supplies the maxillary primary molars, the premolars, and the mediobuccal root of the first permanent molar. There is ni doubt that the middle superior alveolar nerve is at list partially responsible for the innervation of these teeth. However, Jorgnsen and Haydan have demonstrated plexus formation of the middle and posterior superior alveolar nerves in the primary molar area on the child cadaver dissections. The role of the posterior superior alveolar nerve in inervating the primary molar area has not previously received adequate attention. In addition, Jorgensen and Hayden have demonstrated maxilarybone thickness approaching 1 cm overlying the buccal roots of the first permant teeth and second primary molars in the skull of the children. The bone overlying the first primary molar is thin and this teeth can be adequately anesthetized by injection of anesthetic solution opposite the apices of the roots. However, the thik zygomatic process overlies the buccal roots of the second primary and first permanent molars in the primary and early mixed dentition. This thikness of bone renders the supraperiosteal injection at the apices of the roots of the second primary moar much less effective; the injection should be supplemented with a second injection superior to rhe maxillary tuberosity area to the block the posterior superior alveolar nerve as has been traditionally taught for permanent molars. This supplemental injection will help compansate for the additional bone thickness nd the posterir middle superior alveolar nerve plexus in the area of the second primary molar, which compromise the anesthesi obtained by injction at the apices only/ To anesthetize the maxillary first or second premolar, a single injection is made at the mucobuccal fold to allow the soltion to be deposited slightly above the apex of the tooth. Because of the horizontal and vertical growth of the maxilla that as occurred by the premolars erupt, the buccal cortical bone overlying their roots is thin enough to permit goodnesthesia with this method. The injection should be made slowly, and the solution should be deposited close o the bone, these recommandations hold true for all supraperiosteal and block anesthesia techniques in dentistry.

Before operative procedures for maxillary primary molars and maxillary premolars, the appropriate injection technique for the buccal tissues, as just described, should be performed. If the rubber dam clampimpinges on the palatal tissue, a drop or two the anesthetic solution injected into the free marginal tissue lingual to the clambed tooth will alleviate the discomfort and will be less painful thah the true greater 9anterior) palatine injection. The greater palatine injection is indicated if maxilary primary tmolars or premolars are to be extrected or if palatal tissue surgery is planned.

Anesthetizing maxilary permanent molars. To anesthetize the maxillary first or second permanent molars, the dentist instruct the child to partially close the mounth to allow the cheek and lips to be stretched laterally. The tipof the dentist’s left forefingher (for a right-handed dentist) will rest in a concavityin the mucobuccal fold, being rotated to allow the fingernail to the adjacent to the mucosa. The bulbous portion of the finger is in contact with the posterior surface of the zygomatic process. Bennet surggest that the finger be on a plane at right angles to the occlusal surface of the maxillaryteeth and at a 45-degree angle to the patient’s sagital plane. The index finger shoul point in the direction of the needle during the injection. The puncture point is in the mucobuccal fold above and distal to the distobuccal root of the first permanentmolar. If second molar has erupted, the injection should be made above the second molar. The needle is advanced upward and distally, depositing the solution over the apices of the teeth. The needle is inserted for a distance f approximately ¾ inch and in the posterior an upward direction; it should be positioned clo to the bone with the bevel toward the bone.

The complete anesthesia of the first permanent molar for operative procedures, the supraperiosteal injection is made by insertion of the needle in the mucobuccal fold and deposition of the solution at the apex of the mesiobuccal root of the molar.

Anathetizing the palatal tissues. Nasopalataine nerve block. Blocking the nasopalatine nerve will anethetise the palatal tissues of the six anterior teeth. If the needle is carried into the canal, it is posible to anethetise the six anterior teth completely. However, this technique is painful nd is not tinelused before operative procedures. If the patient experiences incomplete anesthesia after supraperisteal ijetion above the apices of the anterior teeth on the labial site, it may be necessary o resort to the nasoplatine injection. Te path of insertion of the needle is alogside the incisive pupilla, jus posterior to the central incisors. The needle is derected upward into the incisive canal. Discomfort associeted with the injection can be reduced when the anesthetic solution is deposited in advance of the needle. When anesthesia of the canine are is required, it may be neecessary to inject a small amount of anesthetic solution into the gingival tissue adjacent to the lingual aspect of the canine palatine nerve.

Greater (anterior) palatine injection. The greater palatine injection will anesthetize the mucoperiosteum of the palate from the tuberosity to the canine region and from the median line to gingival crest on the injected side. This injection is used with the midde or posterior alveolar nerve block before surgical procedures. The inervation of the soft tissues of the posterio two thirds f the palate is derived from the greater and lesser palatine nerves.

Before the injection is made, it is helpful to bisect an imaginary line drawn from the gingival border of the most posterior molar that erupted to the midline. Approaching from the opposite side of the mouth, the dentist makes the injection along this imaginary line and distal to the last tooth. In the child with only the primary dentition erupted, the injection should be made approximately 10 mm posterior to the distal surfae of the secod primary molar. It is not neessary to enter the greater palatine foramen. A few drops of the solution should be injected slowly at the point where the nerve emerges from the foramen.

An extra-short 5/6-inch (16mm) or shot 1-inch (25 mm0 30-gauge needle is recommended for al maxillary injection for the primary dentition. The use of a longer needle is not recommended, because it may result in injecting the agent too deeply, above the ideal area.

The amount of local anesthetic to be enjected is dependent on the length of the procedure and the type of procedure (pulpal, operative, or soft tissue). Dentists tend to inject the entire contents (1.8 mm) of a cartridge whenever they inject. A maximum of 1 ml of lidocaine, often less, is all that is necessary to anesthetise most areas for restorative dentistry in the primary dentition. This dose gives adequate quality and duration of operative anesthesia for the usual pediatric dental procedures.

Anesthetizing mandibular teeth and soft tissue.

Inferior alveolar nerve block (conventional mandibular block). The inferior alveolar nerve block is the most suitable form of local anesthesia for any pediatric mandibular procedure (primary or permanent teeth). The supraperiosteal injection technique may sometimes be useful in anesthetizing primary incisors, but it cannot be relied on for complete anasthesia of the mandibular primay or permanent molars. Although the use of the mental nerve block and infiltration anesthesia may produse satisfactory anesthesia in some cases, it is not uniformly effective. The inferior alveolar nerve block remain the most reliable and effective technique.

The inferior alveolar block is avoided by some dentists in anesthertizing children because of the potential problem of the lip biting during the recovery period. This can be minimized by giving proper portoperative instructions to the child and the parents, by place in a cotton rol in the child’s mouth while the anesthetic is taking effect and on discharge, and by instructing the child, as well as the parents, to keep the cotton roll for about1/2 hour postoperatively or until it is anticipated that the effects of the anesthetic will wear off, which may be as long as 2 to hours, depending on the anesthetic used.

The location of the mandibular foramen in the young child (4 years old and younger) is situated at a level lower than the occlusal plane of of the primary teeth. This has led some to recommend that the injection for mandibular inferior alveolar nerve block be directed below the plane of occlusion in children. This technique has mistakenly been applied to older children as well and may lead to many failures. The location of the mandibular foramen in a child can be accurately located by palpating the deepest curvature of the anterior border of the mandibule with the thamb and locating the deepest curvature of the posterior border of the mandibule with the index finger. The foramen is generally located along the plane. In 3-year-old-child, the foramen is located near the posterior third of the mandibule, while in the older child it is located more near the center.

The point of insertion of the needle should be at the depression on the medial aspect of the mandibule formed by the medial pterigoid muscle. Olsen reported that the injection must be made slightly lower and more posteriorly than for an adult patient. An accepted technique is one in which the thumb is laid on the occlusal surface of the molars with the tip of the thumb resting on the internal oblique ridge and the ball of the thumb resting in the retromolar fossa. Firm support during the injection procedure can be given when the ball of the middle finger is resting on the posterior border of the mandible. The barrel of the syringe should be directed on a plane between the two primary molars on the opposite side of the arch. It is advisable to inject a small amount of the solution as soon as the tissue is penetrated and to continue to inject minute quantities as the needle is directed toward the mandibular foramen.

Insertion of the needle to a depth of 8 to 15 mm from the point of insertion is sufficient to place the needle point in close proximity to the foramen. Deeper insertion results in misplacement of placing of the anesthetic solution. The depth of the insertion will vary with the size of the mandibule and its chainging proportions depending on the age of the patient. A 1-inc (25mm) 27-gauge needle is recommended for this procedure in the child patient.

Slow injection of the local anesthetic agents, at a rare of 1 ml/min, is pain and the risc of untoward reactions. It must be kept in mind that the child who is difficult to manage may make such a prolonged injection impractical or impossible. In such cases as slow an injection as possible should be accomplished. Some clinicians presume that bilateral mandibular nerves block lead to increased lip and tongue biting, or to possible airway blockage due to loss of tongue control. However, there is no clinical evidence to corroborate that contention. There is little danger in administering bilateral inferior alveolar nerve block if such are necessary for the efficiency of the required treatment.

Mandibular conduction anesthesia (Gow-Gates mandibular block technique).

In 1973 Goe-Gates introduced a new method of obtaining mandibular anesthesia, which he referred to as “mandibular conduction anesthesia”. This approach uses external anatomic landmarks to align the needle so that anesthetic solution is deposited at the base of the neck of the mandibular condyle. This technique is a nerve block procedure that anesthetizes virtually the entire distribution of the fifth cranial nerve in the mandibular area, including the imferior alveolar, lingual, buccal, mental, incisive, auriculotemporal, and mylohyioid nerves. Thus with a single injecton the entire right or left half of the mandibular teeth and soft tissues can be anesthetized, with the possible exception of mandibular incisors, which may receive partial innervations from the incisive nerve of the opposite side.

The external landmaks to help align the needle for this injection are the tragus of the ear and the corner of the mouth. The needle is inserted just medial to the tendon of the temporal muscle and considerably superior to the insertion point for conventional mandibular block anesthesia. The needle is also inclined upward and parallel to a line from the corner of the patient’s mouth to the lower border of the tragus. The needle and the barrel of the syringe should be directed toward the injection site from the corner of the mouth on the opposite side.

*Local buccal injection.*On occasions when a rubber dan clamb is placed or for the extration of a mandibular posterior tooth, the inferior alveolar nerve block may not adequately anesthetize the teeth involved. The technique is simply to infiltrate a few drops of anesthetic solution into buccal sulci (mucobuccal fold) just posterior to the molar or into the anterior border of the ramus just lateral to the retromolar pad. (a small quantity of the solution may be deposited in the mucalbuccal fold at a point distal and buccal to the indicated tooth).

Lingual nerve block. One can block the lingual nerve by bringing the syringe to the opposite side with the injection of a small quantity of the solution as the needle is withdrawn. If a small amounts of anesthetic are ingected during insertion and withdrawal of the needle for the inferior alveolar nerve block, the lingual nerv ill invariably be anesthetized.

*Infiltration for mandibular incisors.*The terminal ends of the inferior alveolar nerves cross over the mandibular midline slightly and provide conjoined innervation of the mandibular incisoes. Therefore a single inferior alveolar nerve block may not be adequate for operative or surgical procedure on the incisors, even on the side of the block anesthesia. The labial cortical bone overlying the mandibular incisors thin enough for supraperiosteal anesthesia technique to be effective.

If only superficial caries of mandibular incisor is needed or if the removal of a partially exfoliated primary incisor is planned, infiltration anesthesia alone may be adiquate. Incisor infiltration is most useful as an adjunct to an inferior alveolar nerve block when total anesthesia of the quadrant is desired. In this case the infiltration injection is made close to the midline on the side of the block anesthesia, but the solution is depositit libial to the incisors on the opposite side of the midline. For example, if block anesthesia is used for mandibular right quadrant, anesthetic solution is infiltrated over the left mandibular incisors by insertion of the needle just to the right of the midline diagonally toward the left incisor. Bilatelar inferior nerv blocks are discouraged, espetially in younger children, unles absolutely necessary.

Supplimental Injections. *The infraorbital nerve block and mental nerve block* are two additional local anesthetic techniques used by many dentist. The infraorbital nerve block anesthetizes the branches of the anterior and middle superior alveolar nerves. It also affects innervation of the soft tissues below the eye, half of the nose, and the oral musculature of the upper lip on the injected side of the face. This leaves the child with a feeling of numbers above the mouth similar to that below the mouth when an inferior alveolar nerve is blocked. In addition, there is temporary partial oral paralysis. These affescs do not contraindicated the technique when it is truly neede. However, it difficult to justify in moutine operative and extraction procedures for teeth inervertated by the anterior and middle superior alveolar nerves, since the supraperiosteal techniques are more localized and just effective. The infraorbital block technique is preferred for removal of impacted teeth (spetially canines or first premolars) or large cysts, when moderate inflammation or infection contraindicates the supraperiosteal injection side, or when longer duration or a greater area of anesthezia is needed.

The mental nerve block leaves the patient with essentially the same feelings of numbness as inferior alveolar nerve block. Blocking the mental nerve anesthetizes all mandibular teeth in the quadrant exept the permanent molars. Thus the mental nerve block would make it possible to perform routine operative procetures on all primary teeth without discomfort to the patient. However, we believe that the inferior alveolar nerve block should be favored unless there is a spesific contraindication at the inferior nerve injection site. The mental nerve block is no more confortable for the patient, and the technique puts the syringe in clear view of the patient , whetes the inferior alveolar nerve block may be performed with the syringe out of the child's direct visin.

*Periodontal ligament injections***.** The periodontal ligament injection has been successfully used in pediatric dentistry and has been used for many years as an adjunctive method of obtaining more complete anesthesia when supraperiosteal or block technique failed to provide adequate anesthesia.

The technique is simple, requies only small quantities of anesthetic solution, and produces anesthesia almost instantly. The needle is plased in the gingival sulcus, usually on the mesial surface, and advanced along the root surface until resistence is met. The approximately 0,2 mm of anesthetic is deposited into the periodontal ligament. For multirooted teeth, injections are made both mesially and distally. Considerable pressuer is necessary to expres the anesthetic solutin. Some syringe are equipped with a metal of Teflon sleeve that enclosed the Carpule and provides the necessary protection should breakage occue.

Syringes designed specificaly for the periodontal ligament injection tecnique have also been developed. One syringe, Peri-Press, is desinedwith a lever action „trigger" rhat enables the dentist to deliver the necessary injection pressure conveniently. The Peri_press syringe has a solid metal barrel and is calibated to deliver 0.14 ml of anesthetic solution each time the tigger is completely activated. However, this syringe looks like a gun tends to be a psyhologic disadvantage for its use in children and may contribute to the anxiety reaction of the new or anxiety-prone patient.

The injection is an excellent adjunctive technique for pediatric patients when the patient complains of operative or surgical pain following maxillary infiltration or mandibular alveolar nerve block injections. It requies only a small amount of anesthetic and may be given with the rubber dam in place if neccessary. It may be usefull in young or handicapped patients in whome the problem of postoperative trama to the lips or tongue is a concern. It may usefulin patients with bleeding disorders that contraindicate othe injections. It provides reliable pain control rapidly and easily.

Intraosseous, interseptal, and intrapulpal injection techniques have been known for many years, but they have recentlay recevied renewed attention. Intraosseous injection techniques (of which the interseptal injection is one of the type) require the deposition of the local anesthetic solution in the porous alveolar bone. One may do this by forcing a needle through the cortical plate and into the cancellous alveolar bone, or a small round bur may be used to make an access in the bone for the needle. A small reinforced intraosseous needle may be used to penetrate the cortcal plate more easily. This procedure is not paticularly difficut in children because they have less dense cortical bone tha aduts. The intraosseous technoques have been advocated for both primary anesthesia and adjunctive anesthesia when othe local injections have failed to produce adequate anesthesia. These techniques have been reported to produce profound anesthesia not offer any advantages over the periodontal ligament injection.

Aer jet syringe. Several instruments have offered recentlly that urilize an air-powered jet spray of local anesthetic solution to produce soft-tisure local anesthesia. One such instruments is the Madajer. It sprays a fine jet stream of anesthetics on a limited tissue surface under sufficient pressure to enable the solution to penetrate the tissure. Although such a technique has limited use in pediatric dentistry, it has been used successfully to anesthetize the soft tissure for the application of a rubber dam clamp, also this technique avoid the need for palatal injection to place a rubber dam clamp.

Complication after a local anesthesia. Bennett identifies at least 16 possible complcation of the phychologic effects of local anesthesia administration, the insertion of the needle, or the absorption of the anesthetic solution. *Anesthetic toxici* from local dental anesthetics occurs only rare because the quantity of anesthetic normaly required to perform dental procedures does not approach toxic levels. Local anesthetic solution are used so commonly and so successfully by dentists that it is easy to forget that drugs may be toxic if inproperly used. It is most imporant for dentists who treat children to be acutely aware of the maximum recommended dosages If the anesthetic agents they use, since allowable dosages are based on the patient’s weight. For example, according to to the formula inAccepted dental Therapeutics (Clark’s rule), the toxic dose of Lidocaine with 1:100,000 epinephrine were injected at one time in a patient wighing 14 kg (30 pounds). Yet 5/2 Carpules of the same anesthtic agent would be required to reach the toxic level in an adolescnt patient weighing 46 kg (100 pounds). It is obvious that caution must be exercised when into a small children. Toxic reactions to local anesthetics are characterized by an initial excitatory phase followed by marked depression. The patient may become talk-ative and anxious. Nausea and vomiting may occur. If the drug is given intravenously, the initial excitatory phase may be brief, terminating in con-vulsions followed by marked depression. (When administering a local anesthetic, always aspirate before injecting). If any signs of reaction to the drus are noted during an injection, the needle should be withdrawn immediately.

Most toxic reactions to local anesthesia are of a minor nature and can be treated palliatively. If convulsions occur and become increasingly intense, a short-acting barbiturate or diazepam should be given intravenously to control the convulsion. Oxygen should then be given to ensure adequate oxygenation. When the stimulatory phase is mild or of short duration, no sedative is given but oxygen is administered, and steps are taken to maintain adequate circulation.

T*rauma of soft tissue.* Parents of children who received regional local anesthesia in the dental office should br warned that the soft tissue in the area will be without sensation for a period of 1 hour or more. These children shoud be observed carefully so tht they will not purposely or inadvertently bite the tissue. Children who received an inferior alvolar injection for routine operative procedures may bite the lip, tongue, or inner surface of the cheek. Sometimes a patient calls the dentist's office an hour or two after a dental appointment o report an injury to the child's oral mucous membrane. The parents may be wnder if the accident accured during the dental appointment; in all probability the child has chewed the area, and the resut 24 hour later is n ulceration, often termed a „traumatic ulcer" Complcation after a self-inflicted injury of this type are rare. However, the child should be seen in 24 hours, and a warm saline mouthrinse is helpful in keeping the area clean.

Conscions sedation. When the behaivioral apprach in conjunction with local anesthesia, does not acheve satisfacatory control of the pediatric patient's behavior, the next step is the pharmacological approach. The sedative agents help reduce fear and anxiety and assist the anco-operative child to accept required treatment.

Pediatric patients with extensive and complicated treatment needs, acute pain, traumatic injuries, or devolpmental disabilities, as well as those who are physically diabled or mentally retarded may require sedation or general anesthesia. Although a general contraindication to sedation in the dental office is the presence of a severe, compromising medical condition, even some children in this category may benefit from its use. These children should be managed in close co-operation with the physician involved in their medical care. At times the very young child and those with limited or compromised ability to comprehend and communicate also are candidates for such procedures. Additionally, there is an indication for sedation in those situation in which the child might be better served by increasing the length of the appointment time, thus reducing the total numer of visits required to accomplish the indicated treatment.

In safe and commonly used anxiety-control technique used for pediatric patients in the dental office is *conscious sedation*. Conscious sedation is the minimally depresed level of consciousness that retains the patient's ability to maintain a patent airway independently and continuously and respond appropriate to physical stimulation and or verbal command, such as „open your eyes".

The common denominator to this approach is simply that the drugs used act to reduce the functional activity of the higher centers of the CNS. The protective pharyngeal and laryngeal reflexes are not dulled, so the child car maintain his or her own airway. The degree of awareness of the surroundings and responses to stimuli are variable and tend to be subdued leading to altered responses.

For the very young or handicapped individual, ancapable of the usully expected verbal responses, a minimally depressed level of consciousness should be maintained. Relief of pain is not a major goal in conscious sedation and analesia is seldom produced to any significant degree. Therefore, the use of local anesthesia is required if any type of painful procedure is performed.

Deep sedation. Is a controlled state of depresed consciousness or unconsciousness from wich the patient is not easily aroused, which may be accompanied by a partial or complete loss of protective reflexes, including the ability to maintain a patient airway independently and respond purposefully to physical stimulation or verbal command.

Drug used for conscious sedation in children. The drug groups for pediatric sedation in the dental office includee, butt are not limited to inhalation agents, nitrous oxide, and oxygen, the sedative hypnotics, which include the alcohols (chloral hydrate) and barbiturates (methohexitol), psychosedatives, which include the diphenylmethanes (hydroxyzine), the benzodiazepines (diazepam and midazolam), the phenothiazines (promethazine) and the ethanolamines (diphenhydramine), and the narcotics (morphine, meperidine, fentany).

Draugs that generally are recognized as general anesthetics but in low doses have been used to produse sedation, include the ultrashort-acting barbiturates (thiopental, methohexital), the halogenated inhalation agents (enflurane), and the dissociative agent ketamine. However, general anesthetic agents should be administered only by individuals who have had extensive training in general anesthesia.

General anesthesia occurs when sedation becomes even deeper and is a controlled state of unconsciousness accompaind by a loss of protective reflexes, including the abilty to maintain an airway independently and respond purposefully to physical stimulation or verbal command.

Indications for general anesthesia. General anesthesia is indicated for children with mental retardation to the degree that the dentist cannot communicate effectively. It is also indicated for children in whom adequate co-operation cannot be achieved by the usual behaviorl guidance procedure, supplemented y premedications, analgesia, and or acceptable degree of phisical restraint. Finally, general anesthesia is indicated n children with systemic disturbances and congenitl anomalies that dictate general anesthesia.

Patient evoluation and preparation. Before sedatting any child a through health and family hstory should be obtaind including the following: 1. Allergies and prevous allergic reactions; 2. Current medications including dose, time, route and site of administration; 3. Disease, disorders, or abnormalities (Down syndrom); 4. Previous hospitalization, to indicate the date and for what purpose, together with any history of general anesthesia and hospital course; 5. Family history of diseases or disorders (heart, kidney, and lliver); 6. Review of systems, with a statement as to airway patency (history of snoring and or mouth breathing); 7. Vital signs, including pulse and blood pressure; 8. Vital statistics: weight and age in years and months should be recorded.

The child should have had a complete phisical evaluation within the past year and preferably within the last month.

Although a severe, compromising medica condition such as American Society of Anestesiologists (ASA) III is a general contraindication to sedation in the dental office, some children in this clasification may benefit from its use. These children should be managed in close co-operation with the child's physician. Treatment of children in ASA classification III and IV might be the best manage in a hospital or hospita-like facility, especialy for lengthy treatment procedure.

The child's behavior in the dental office should be evaluated and documented. A behavior scale such as Frankl's categories of behavior may be utilazed for consistency.

American Society of Anesthesiologists Classification. Class I. There is no organic, physiologic, biochemical, or psychiatric disturbance. The pathologic pocess for which operation is to be performed is to be performed is localized and is not a systemic distabance. Class II. Mild-to-moderate systemic disturbance caused either by the condition to be treated surgical or by other pathophysiological processes. Class III. Severe systemic disturbance or desease from whatever cause, even though it may not be possible to define the degree of disabiliy with finality. Class IV. Indicative of the patient with severe systemic disorders that are already life-threatening. Class V. The moribund patient who has little chance of The number of emergencies that arise in a dental office is inversely survival but submited to operation in desperation.

Emergencies in the dental office proportional to the preventive measures taken by the dentist. A good medical history, carefully evaluated, may be the best insurance against office emergencies. Although dental emergencies are rare, the dentist and staff must be prepared to manage those that do arise. A well-organized plan of treatment should be worked out and rehearsed to cope with these situations. Emergency drills, just like fire drills, may save lives. Emergency situations can be of a minor or a major nature, but in all instances, if improper care is given, the outcome can be disastrous.

The dental office should be equipped with oxygen that can be applied under positive pressure. An emergency tray containing all the necessary drugs should be readily available and checked from time to time to ensure completeness. Drugs should never be taken from an emergency tray for routine use.

Syncope (fainting) is probably the most common emergency and is usually associated with the administration of a local anesthetic. Syncope (vasodepressor syncope) acute cerebral anemia is the earliest form of shock and it is generally transient. The etiology is cerebral hypoxia, resulting from the disturbance of the normal mechanism of blood pressure control. Dilation of the splanchnic vessels causes a fall in blood pressure with a decrease in cerebral blood flow. The initiation of this reaction is of a psychic nature and should not be interpreted as a reaction to the drug administered. Symptoms include ashy gray color or pallor of the skin, cold perspiration, feeling of dizziness, light-headedness, clammy skin, nausea, and sometimes complete loss of consciousness. The treatment consists of placing the patient in a supine position, with the head lower than the rest of the body. An airway is maintained, and oxygen should be administered. Mild respiratory stimulants such as spirits of ammonia can be used, but analeptics and other more potent agents are generally not used unless specifically indicated. Prevention of syncope can be accomplished by considering the psychic constitution of the patient.

If failed to not the objective symptoms of impending syncope, and is suddenly awake that his patient is unconscions that his pupils are widely dilated and that he is manifesting convulcive movements of the extremities as a result of the cerebral hypoxia 100 per cent fair hunger is apparent. Persistent hypotention may require use of ephedrine, epinephrine methoxamine hydrochloride, methedrine. Keep the patient warm and supine position until he has fully recovered, check the patient's puls, respiratory rate, take the blood pressure periodically.

Silent or overt regurgitation of stomach contents commonly occurs with vasodepressor syncope. Aspiration of this material could precipitate a like-threatening emergency, and the surgeon or auxiliary is advised to check the airway for patency immediately after placing the patient in the supine position. The best way to treat syncope is by prevention. Adequate premedication when indicated is helpful, but when a patient presents with a history of syncopy, especially following the injection of a local anesthetic solution, it is probably advisable to put the patient in the typical recurmbent "shock" position prior to the infection.

Shock is a circulatory deficiency that is either cardiac or vasomotor, in origin and characterized by decresed cardiac output and hemoconcentrtion. While psyhogenic syncope is the most frequent immediat postinjection and surgical complication, the oral surgeon must not forget the possibility of hypovolemic shock, that caused by peripheral pooling of blood and cardiogenic shock during or immediately after a prolonged surgical procedure in the oral cavity.

Shock passes through several stage. Primary shock result from reflex and emotional causes and is essentiall syncopy. Secondary shock appears when the primary is not immediately fatal. The skin is pale, cold and clamm from seat, the mucous membranes are pale, the lips, nose, tip of the fingers and toes, and lobes of the ears are grayish blue, the face appears pinched and expressionless, the eyes are sunken and fixed with a purposeless stare, the pupils are dilated and react but feelly. The puls is weak, usually rapid, and often intermittent, the respiration are raid, shallow and irregular and there is an occasional sigh, he temperature is below normal. Consciousness usually is maintained, though the mind is apathetic. All these sighs are evidence of decreased circullary volume that is becoming.

Treatment depending on is it due to hypovolemic circulation, painful stimuli or emotional upset. 1. Absolute rest and relief pain or distress. If present may be gained by administering an analgetic or narcotic. Body heat should be maintained by keeping the normal room temperature and placing a light sheet, drape or blaket over the patient. The patient in oligenic shock should have his legs elevated 20 degrees to perfuse the vital centers properly, while the head and thorax should be elevated 5 degrees, lowering the diaphragm to provide better ventilation. 2. Lost body fluid must be restored. 3 Adiquate oxygenation of the body tissues must be maintained at all time.

In cases of severe central nervous system stimulation or depression or cardiovascular collapse, the dentist should initiate treatment but call for additional professional help. The calling of other professional personnel does not indicate inadequacy on the part of the dentist but instead shows good judgment.

Angioedema is a symptom complex frequently recognized as having a varied mechanism of underlying hereditary allergic and psychophysiologic factors. Angioedema and urticaria are similary. To avoid allergic reactions to medication, the dentist should complete an adequate history and evaluation before using the drug.

Allergic reactions to drugs can vary from delayed reactions that are more annoying than dangerous to anaphylactoid reactions that are severe and often lead to the death of the patient. Most drugs at one time or another have been associated with allergic reactions. Penicillin, sulfonamides, and other antibiotics are the most common drugs the dentist may use that are associated with allergic reactions.

Delayed or less severe reactions may be characterized by swelling at the site of injection, angioneurotic edema, pruritus, and urticaria. Treatment consists of antihistamines and palliative care. Anaphylactoid reactions develop quickly. The patient becomes extremely apprehensive, intensive itching occurs, and asthmatic breathing develops. Urticaria may develop rapidly; the blood pressure falls, and the pulse becomes weak or absent. The patient may lapse into an unconscious state with or without convulsions. Death may occur within a few minutes or several hours later.

Treatment of an anaphylactoid reaction consists of the immediate application of a tourniquet above the site of injection if possible.

Because of the vasopressor, bronchodilator, and antihistaminic effects of epinephrine, it is the drug of choice in reactions of this type. The dosage in the adult will range from 0.3 to 1 mg (0.3 to 1 ml of a 1:1.000 solution) subcutaneously or intramuscularly. In all severe systemic reactions a can-nulated vein allows for rapid use of drugs and fluid management. If possible, an intravenous route should be started and maintained. The intravenous route allows for titration or fractional doses of epinephrine, although the total dosage is approximately the same. Oxygen under pressure should be given with assisted respiration. Antihistamines, such as diphenhydramine, 50 mg, are given intravenously or intramuscularly. Corticosteroids such as hydrocortisone (Solu-Cortef), 100 mg intravenously or intramuscularly, are usually recommended for their peripheral vascular effect. Professional aid should be called as soon as possible to consult in the further treatment of the patient. If symptoms continue, consider readminis-tration of epinephrine or antihistamine. If the blood pressure is low, consider the use of a vasopressor drug such as phenylephrine, 1 to 5 mg intramuscularly.

Drugs for pediatric emergencies.

Oxigen Supply

Pozitive pressure, 10 L/min for 60 min (650L, E tank)

Allergic reaction – mild and mild asthmatic attack

Diphenhydramine (Benadryl) (50 mg/ml), 1-2 mg/kg to 50-100 mg max, PO or IM.

Metaproterenol (Alupet), 2-3 inhalations q4-6 hr.

Anaphylactic reaction and severe asthmatic attack

Epinephrine 1:1000 (1.0 mg/ml), 0,01 mg/kg to 05 mg maximum SL or IV.

Hydrocortisone-Sodium Succinate (Solu-Cortef), 2.5010mg/kg to 500mg maximum IV or IM.

Seizures-prolonged (15-20min)

Diazepam (5.0 mg/kg), 0.03 mg/kg IV (1ml/min).

Bradycardia (40-60 min)-owing to vagal stimulation, not hypoxia.

Atrophine sulfate (0.4mg/kg), 0.02 mg/kg to 10mg maximum IV.

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