

## THE CONTROL OF PAIN AND COMPLICATIONS FOLLOWING DENTAL OPERATIONS

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For too long a time, the profession and the laity have regarded the removal of a tooth as an inconsequential, simple act which scarcely merited the term "operation." Yet nowhere in the body must an operation be performed under less ideal conditions—the field cannot be kept aseptic, the lack of accessibility and visibility are factors which tend to increase the hazards of traumatization, the skeletal tissue as well as the soft tissues must be disturbed, the pain is amplified by the generous nerve supply from the central nervous system, and finally, the course is laid open for invading organisms to gain the vital centers by approximation to important venous and arterial pathways. In spite of these hazards, the dental profession still is slow to accept the mandates which have been recognized by the other branches of surgery.

From a standpoint of interest, if one follows the history of methods and technique of major operations from an early date to modern times, one sees signs of progress accompanied by statistics which show the ever-increasing curve of success. If one studies the change in the concepts of oral surgery, one notes little actual progress in this phase of dentistry. Progress in the science of dentistry has been steady, but in the majority of cases in which oral surgery is performed, the barber chair in the dentist's office with the mechanical background still serves as the place for the disruption of the physical equilibrium. Therefore, is it any wonder that patients dread the actual removal of a tooth more than a major operation? Yet the consequence of the procedure itself is regarded as insignificant and one for little concern.

If postoperative pain which is due to trauma during a dental operation were expressed by mathematical formula, it would be "in proportion to the general physical resistance and mental reserve of the patient," i. e., the better a patient's health and nervous balance, the less significant is the pain following the trauma which cannot be eliminated entirely in any operation. By the same token, pain and complications which develop following infection are in proportion to the irritation of the causative organisms, which in turn are dependent upon the local resistance of the tissues involved, and again, upon the general resistance of the body. General resistance, to be defined in turn, is an "abstract term to estimate the quality and potentialities of the circulating tissue in maintaining human economy at its optimum."<sup>1</sup>

Infection may follow a dental operation because the surgeon did not observe the physical signs of lowered resistance. It should be an axiom that no oral surgery should be attempted where the cardinal signs of inflammation are present or when the temperature is abnormal, and

in this regard, how many dental offices are equipped with a thermometer? This instrument usually is conspicuous by its absence in the average office. Therefore, in the presence of lowered resistance or elevated temperature, no surgical procedure should be undertaken, but the condition of the soft tissues should be treated, and the pain controlled by the use of sedatives or opiates.

In all dental operations, we attempt to divide the procedure into three definite parts, the preoperative, operative and postoperative.

*Preoperative treatment* has been given very little consideration by the dental profession, with the result that many patients regard preoperative precautions as unnecessary. Indeed, since it usually is only the force of necessity which drives these patients to the dentist, and this only as a last resort when the physical and mental resistance have been weakened excessively by fatigue, lack of appetite and intermittent pain, preoperative measures should be given the utmost consideration. We feel that a physical examination should be made in each case and that this should include examination of the blood and the urine. Such a routine will assist greatly in the anticipation of the reactions to be expected. We have learned from experience that when the patient seems to have a lowered general resistance, the removal of teeth usually is of secondary importance, and if the internist feels that the patient can withstand the ordeal, he then is hospitalized overnight, and the operation is scheduled for the next day. However, if the physical condition is impaired due to long-standing debilitation, a regimen is prescribed to assist in building up the physical endurance, and the operation is deferred until the general condition is improved. It has been our observation that, regardless of the extent of trauma which is required to remove the oral focal infection, patients who have been hospitalized invariably have less postoperative pain, swelling and bleeding and quicker healing than do those who have the offending tooth removed without any preliminary examination to guide the operator. We ascribed this to the preoperative care which hospitalized patients receive. However, in the group of cases where the physical condition appears to be excellent, and where we are unable to convince the patient of the wisdom of preliminary examination, we proceed to minimize this preoperative phase and hope that postoperative troubles will be small. As this group of patients becomes smaller, greater progress in oral surgery will be assured.

Before extraction is performed, we have found that it is vitally necessary to control the psychological fear and maintain the mental balance of the patient. This is accomplished by telling him exactly what to expect and attempting to portray our ability to overcome obstacles as they may arise. Medication is required in some neurotic types of individuals, and in such cases, we use Nembutal, which ren-

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ders the patient more responsive to the anesthesia and reduces the nervous tension. This also results in less radiated neurosis to the operator.

*Operative procedure:* In the second phase or during the operative procedure, we attempt to reduce trauma to the minimum, although there must be some trauma because no organ of the body can be disturbed without the production of some degree of pain. It is needless to say that sterility of instruments is axiomatic. During the operation, we attempt to keep all saliva and contamination out of the wound by the use of gauze tampons on the floor of the mouth and around the operative field.

If tissues must be cut and bone removed, sharp instruments are necessary, and it should be remembered that tissues should not be cut too near a muscle attachment or in such a manner that the blood supply is disturbed.

In all extractions of teeth, the alveolar processes of the maxillary bones are sprung during the operation. This is a traumatic process which can be minimized, however, if after extraction, the alveolar processes are compressed in place by the fingers which compensates for the spring and assists in reformation and healing.

After extraction, all small spicules or tissue tags should be removed. To accomplish this, the wound may be irrigated gently with a saline solution, and then the flap is tacked into place by sutures to assist in the formation of a blood clot. The formation of this healthy blood clot is very important in minimizing postoperative pain because it effectively seals the socket from food and bacterial debris. The gentle saline irrigation acts in two ways—it removes debris from the area and starts a fresh flow of blood which forms a healthy, sterile clot.

*Postoperative procedure:* We believe that postoperative measures combined with preoperative precautions comprise the most important procedures for the control of pain and complications following extraction of teeth. If the patient has had ample preoperative care, if his physical resistance is known, and if the postoperative phase is followed as outlined, the patient will experience little pain or annoyance in spite of excessive trauma.

Dr. José Aurelio Ortiz<sup>1</sup> of Northwestern University places maximum emphasis on the preoperative stages. In his cases, he used one of the following three methods of immediate postoperative treatment following a simple extraction by forceps with a minimum amount of trauma: (1) The sockets were thoroughly irrigated following extraction and packed with medicated waxes or dressing for the first 24 hours; (2) after the use of an aseptic technique and isolation of the field by gauze tampons, the patient was advised to bite on fresh gauze

for 10 minutes to insure the formation of a sterile and firm clot before saliva came in contact with the open wound; (3) all these precautions were disregarded; the tooth was extracted with a minimum amount of trauma, and nature was allowed to follow its course. These methods were used following the most simple operative procedure in the extraction of 220 teeth. In 202 instances, healing occurred within the normal span of time regardless of treatment of sockets, and 18 healed in sub-normal time. Apparently the healing time did not depend upon the condition of the tooth. Considering the 18 instances in which there was a delayed healing period, Ortiz reasoned that such a condition was due either to the quality of the blood stream, the resistance of the individual, or the condition of the alveolar bone, which would be altered by the presence of a condensing osteitis or sclerosis of the lamina dura. He concluded, "consequently, if the resistance is high, the disturbing agents are overcome rapidly; if the resistance is low, the other factors merely prolong the course of the struggle. . . . In all instances, it is the quality of the blood that plays the major rôle."

Following extraction, it has been our policy to advise that an ice cap be kept to the face for about two hours. This prevents swelling, pain, and bleeding, and assists in the clot formation. Nothing should be taken into the mouth for a period of three hours, and the patient should refrain from smoking. This allows undisturbed formation of the clot and prevents dislodgment before it has been firmly established. A saline cathartic should be taken, and a liquid diet should be followed for the first 24 hours to assist in the elimination of toxins released by the extraction and to aid in the prevention of undue swelling. In cases of excessive trauma, it is well to use a small dressing of iodoform gauze with Acrithesin, a preparation of Abbott containing anesthesin, trichlorbutinal, acriflavin and eugenol, which has obtundent, antiseptic and tissue-stimulating qualities. For a mouth wash, one-half teaspoonful of salt to 8 ounces of warm water is prescribed, and this is used as frequently as possible after the three-hour period. We do not believe that a socket ever should be packed because this will prevent the formation of the clot, it lengthens the time required for healing, and it is attended by pain and discomfort. All extractions are followed within 24 hours by a radiograph.

If excessive postoperative pain occurs, the cause—local or general—should be determined. If this is found to be a foreign body, it should be removed; if it is due to a so-called "dry socket" in which the clot has been lost and the socket lies open to contaminating agencies, it should be treated locally by gentle irrigations with warm Dakin's solution, warm saline solution or both, followed by a dressing of Acrithesin. We make up a prescription in which Acrithesin is the base, which is mixed with iodoform powder, mercurochrome, and

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powdered Dakin's tablet. This is used on sterile gauze which is placed in the wound, and is usually sufficient to give almost immediate relief. The socket should be irrigated daily and the dressing changed. If there is an increase of swelling with a rise in temperature in addition to pain, the patient should be hospitalized, hot saline mouth wash prescribed, packs of saturated solution of magnesium sulphate should be applied to the affected side, and an incision for drainage should be made when the temperature falls.

### COMPLICATIONS

One of the complications which follows extraction which has a serious aspect and grave prognosis is osteomyelitis, an infection of the medullary portion of the bone. It is characterized by the symptoms of fever, swelling with trismus and general malaise. In the early stages of the disease, radiograms show no abnormality and are of little value in making a diagnosis, but in the suppurative stages they do show the extent of the infection. In treating this complication, we use hot saline irrigation intraorally and hot salinated solution of magnesium sulphate extraorally, which assists in organization. When the fever drops, and the area is fluctuant, the wound is opened and drained.

Osteomyelitis may lead to another complication, which although it is rare, may follow dental operations—namely, cavernous sinus thrombosis. This is characterized by a high fever curve, rapid pulse, general prostration, prominence of the veins near the eye associated with increasing proptosis of eyeball, slight headache and rigid neck. Usually within 48 hours after the onset of the latter symptoms, the conjunctiva begin to protrude in yellowish folds, vomiting occurs, and the patient lapses into coma and dies. The mortality from this disease is very high. Stewart<sup>2</sup> states, "Death is practically certain without an operation, while the mortality after operation is about 50 per cent." The etiological factor is the Staphylococcus, and symptoms of meningitis and septicemia are present. At autopsy, metastatic abscesses may be found in various parts of the body, particularly the lungs.

A third complication is Gensoul's disease or Ludwig's angina which occurs in the soft tissues of the floor of the mouth in the form of cellulitis which may be an extension of an infection of the submaxillary gland. It is very difficult to determine early whether an existing cellulitis will develop to the extent of being classified in this serious category. The condition progresses rapidly, however, and within three or four days, the neck becomes so swollen and painful that respiration is difficult. The tongue is found to be thick and swollen and trismus is very marked. This is accompanied by high temperature and symptoms of infection. Disturbances of the circulation may be so great that a localized gangrene may result and dyspnea may be caused by pres-

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sure on the trachea. In the early stages it is difficult to distinguish this from a cellulocutaneous or phlegmonous erysipelas. The prognosis is not favorable, and it has been estimated that about 40 per cent of the cases terminate fatally. Mead<sup>3</sup> states that "there is good reason to believe the Ludwig's angina and noma are the terminal local results of infection starting as a cellulitis or adenitis in patients of lowered resistance. In other words, cellulitis and adenitis in patients of good resistance when proper treatment is applied, usually respond to treatment. In other cases, in which the general resistance is low, in spite of proper treatment, the condition may extend to a more severe type of local destruction or gangrene with the classical picture of either a Ludwig's angina or noma."

These complications may occur without the trauma attending dental operations, because they are dependent to a large measure upon the general physical condition, and when they do occur following dental operations, regardless of whether the trauma is the etiological factor, the surgeon assumes the liability. Thus, it behooves the oral surgeon to use all the preoperative precautions possible to prevent such occurrences, and by making this a routine procedure, he should have sufficient control over the postoperative course to cause the patient little pain or discomfort.

### REFERENCES

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3. Mead, S. V.: *Oral surgery*, C. V. Mosby, St. Louis, 1934.