

Textbook of Oral and Maxillofacial Surgery

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(The C V Mosby Company, St Louis, Toronto, London, 1979)

Fifth Edition

Chapter 3

Introduction to exodontics

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General Principles

A careful technique based on knowledge and skill is the most important factor in successful exodontics. Living tissue must be treated with gentleness. Rough handling, ragged or incomplete incision, excessive retraction of flaps, or uneven suturing, even though not painful to the anesthetized patient, will result in tissue damage or necrosis, which in turn provides an excellent medium for bacterial growth. Healing that could have taken place by primary intention must granulate from the bottom of the wound after necrotic tissue is phagocytized. This causes pain, excessive swelling, and possibly deformity. Gentle handling and instrumentation with a sharp, well cared for armamentarium are rewarded with a better tissue response.

Psychology

Science of behaviour. The reaction with which different people respond to the same stimulus varies considerably. Individuals react to pain according to their basic make-up, which may range from stoicism to extreme sensitivity. An occasional patient who does not want an anaesthetic may sit through an extraction with few outward signs of pain. Another patient with profound local anesthesia may jump when a forceps is placed on the tooth. The stoic patient is able to disregard a certain amount of the pain felt. A story is told of one Christian Science patient who refused an anesthetic of any kind. She telephoned her practitioner and left the telephone of the hook even though it was across the room and therefore the reading was unintelligible to the patient in the chair. The patient did not move or make outward sign of discomfort during the extraction, although tears streamed down her cheeks.

The psychological effect of the placebo has been studied many times. A double-blind study to compare the sedative effects of a therapeutic agent with those of a bland pill of similar size and color was so conducted that neither the operator nor the patient knew which pill contained the active agent. Patients were told that a sedative or analgesic agent would be administered; they did not know that there was an equal possibility that a sugar pill might be administered. At the end of the experiment, after the reactions of all patients have been recorded, the code was opened, and the completed record cards were marked with the ingredients. In numerous such studies involving many ills and various drugs, no less than 35% of patients experienced relief using the placebo. The point was made that real pain was

relieved in these patients, not merely imagined pain, indicating that physiological and psychological processes can be modified by psychological attitudes. In another double-blind experiment an injection of either a normal saline or a local anesthetic solution was given in the oral tissues of dental students. A significant number of students injected with saline had complete objective and subjective signs of anesthesia.

Circumstances have much to do with pain perception. Soldiers in stress of warfare have been subjected to major injuries that were unfelt and unknown to them until the immediate objective was won. Children sometimes will react with fear to the white coat worn by the practitioner, and consequently some pedodontists wear street clothes in the office.

The pain threshold varies significantly in individuals. What is major pain to one person at one time may be minor pain to another person. The introduction of a hypodermic needle into the vein of the arm may be barely felt by one individual, although it may be felt as excruciating pain by another.

Emotional control in the presence of pain varies considerably. Patients with the same threshold of pain can range from the individual who overreacts, such as the child who has no inhibitions, to the patient who will give no outward sign of pain.

The anxious patient. Fear can be related to any one of several factors:

1. Fear of fear itself. Remembered fear from a painful childhood incident that has been relegated to the subconscious mind or even tales of painful experiences told by someone else can condition the patient to fear the fear he associates with the procedure. This is mainly an introverted reaction, although extraneous factors, such as long-remembered odors, colors, and situations, may stir latent memories.

2. The operation. Any normal individual has some degree of concern about an impending operation. General surgeons say that the patient who approaches major surgery with no concern at all does not have the same chance of survival as the patient who has stimulated his adrenal cortices to some extent. Everyone has stresses in life, but the size of the factor required to stress an individual and his response to that stress vary. It is the concern of the dentist and his entire staff to reduce this normal fear to its absolute minimum. Every successful practitioner induces in patients confidence that ameliorates natural fear. The patient should be prepared psychologically before any operation is performed, and in many cases the preparation is done by thoughtful considerations by the staff and practitioner even without words. Most dentists will not extract teeth for the patient who grips the arms of the chair until white knuckles show, preferring to prepare him psychologically and by premedication for a more relaxed subsequent appointment.

3. Esthetics. The menopausal matron whose children are married, whose husband, at the peak of his career, is busy and inattentive, and who has lost her girlhood beauty thinks beyond the full maxillary extractions for which she is sitting. This last insult to her beauty has been likened to a subconscious castration. She is fearful she is losing the power in society that beauty once gave her, and this is the last straw in that process. This fear can be aggravated by mental instability associated with the menopause. The wise dentist proceeds slowly in recommending such extractions, showing all the pathological reasons for removal

of the teeth and allowing the patient herself to first express the conclusion that all teeth should be removed. Her first statement to this effect seems to prepare her better from a psychological standpoint. Of course, the practitioner in doing this occasionally encounters the matter-of-fact matron who says, "Come, come, young man, what are you saying? What is your diagnosis?"

It must be remembered that the pain the anxious patient experiences is really felt by that patient, even though in some psychosomatic illnesses no objective organic basis for the pain can be found.

Evaluation and preparation. The general psychological makeup of the patient should be evaluated before treatment is undertaken. His self-confidence, self-reliance, general attitude, and demeanor give clues to his later reactions. The neurotic patient has a nervous instability that must be taken into consideration when premedication and management are planned. The big policeman who swaggers in saying that he is afraid of nothing often is the first to go into syncope when the forceps appear. The banker's wife whose position has made her immune to physical and mental insult may react vocally on extraction even in the presence of adequate anesthesia; firmness by the operator at the moment, followed after the operation by kind words of commendation of the unpleasantness, will make a firm friend. Age, race, health, physical considerations, and even vocation present variables that must be considered in evaluating the patient.

In verbal presentation of the exodontia problem, the patient should be told what to expect. Possible complications and postoperative problems can be identified without describing every catastrophic detail. The patient may have occasion to verify these experiences later and thereupon will have more confidence in the dentist who anticipated them. Terminology is important. For example, when considerable alveoloplasty is anticipated, the patient is told that the parts will be smoothed to create a better base for the denture in anticipation of natural resorption. The gory details are best left unsaid. During the operative procedure the patient is forewarned of noise made by instruments such as the chisel or rongeur.

Psychological office management. The office and its personnel should be geared to the instillation of confidence in the patient from the moment he arrives. Nothing defeats this objective as much as ignoring the patient in a bustling, impersonal office. As one of their primary functions the office personnel should show concern for the patient.

Another irritation in the office is extraneous noise. One practitioner had a quiet office in which the entire wall facing the chair was replaced by two pieces of plate glass extending from floor to ceiling, which formed a tropical fish tank. This was most restful to the patient.

Instruments should never be exposed to view. Odors suggestive of medication should be eliminated as much as possible. Adequate premedication is given if necessary. A towel head wrap can be placed over the patient's eyes if considerable instrumentation will be done.

The operator should exhibit sympathetic actions: gentleness and tranquility. He or she should be calm and self-reliant to inspire confidence. The terminology should be arranged so that if a new needle is desired he or she will call for a "point". The entire office should be

devoted to eliminating psychological problems in patients and to ensuring them only minimum mental discomfort while in the office.

Psychiatric aspects. Neurotic patients need dental extractions just as much as normal patients do, but there are several differences to be observed in their management. First, the neurotic patient often has tensions that make management difficult. Second, the neurotic or slightly neurotic patient can exhibit bizarre postoperative reactions such as prolonged symptoms of local anesthesia, unnatural or prolonged wound pain, and other hysteria-like phenomena. The patient may return for months and then start legal action. Third, the neurotic patient will insist on prescribing operations for himself that will, in his mind, cure him miraculously of his troubles. He may complain of a vague pain in the maxilla for which no organic basis can be found and insist that the second molar be extracted. Complete examination will show a healthy tooth. After visiting several dentists he will find one who will extract the tooth. Immediately the pain will disappear, vindicating the patient's diagnosis and making this dentist the best one he has ever known. Unfortunately, within months the patient will return, complaining of the same pain and demanding that the second premolar be removed or, if all teeth on that side have been removed, that the maxilla be opened surgically to remove "bad bone". Once the initial nonpathological tooth is removed, it is almost impossible to convince the patient that this type of treatment will do no good and that psychiatric evaluation and treatment are necessary. If the dentist feels that the patient may take umbrage at such recommendation, he can always refer him to a neurologist for evaluation of the neurological pathways.

Anesthesia

Whether the operation is performed with the patient under local or under general anesthesia depends on many factors, including the custom, training, and equipment of the dentist, the wishes and physical status of the patient, the presence of an acute periodontitis or pulpitis that may make local anesthesia difficult, the presence of infection in the surrounding tissues, and the extent of the procedure.

Some operators use local anesthesia for every type of procedure, with major block anesthesia and premedication to manage the difficult cases. Others use general anesthesia for everything.

Premedication. Premedication with local anesthesia for extraction is helpful, especially if the operation is expected to involve complicated procedures. Premedication must be tailored for each individual. It can vary from a barbiturate or ataraxic drug taken by mouth at home or in the waiting room to an intramuscular injection of a synthetic narcotic or an intravenous injection of a barbiturate given when the patient is in the chair.

Intravenous premedication is an art as well as a science. Techniques have been developed that range from a single intravenous injection to a continuous injection using a combination of drugs to provide sedation throughout a longer procedure. These techniques provide sedation and amnesia, but they do not create an unconscious patient with all the additional factors that need to be monitored such as respiration, blood pressure, and airway.

One widely employed technique involves the intravenous injection of diazepam in amounts of 20 mg or less before the local anesthetic is administered. The drug is injected into the median basilic vein or preferably into the hand vein. The latter is preferred because it is safer (the vein is never mistaken for the artery in the hand), although it is perhaps more painful. The drug is injected at the rate of 5 mg per minute, and injection is discontinued when the eyelids droop. Local anesthetic is injected into the oral tissues immediately after the needle is removed from the hand.

A better technique, however, seems to be the injection of the intravenous ataraxic immediately before the surgical procedure is started. In this procedure local anesthesia is administered without premedication, using a careful technique preceded by a topical anesthetic that has remained against the site of injection for 3 minutes. The patient is allowed to sit in the quiet operatory until profound anesthesia has occurred. Intravenous premedication given just before surgery changes his mental attitude at the most important time. Rarely is more than 10 mg necessary if given at this juncture.

Inhalation analgesia with nitrous oxide-oxygen is an important recent advance in sedation techniques.

Examination of the patient

The more experience a dentist has in exodontics the more aware he or she is of the complications that may occur and the more thorough is the examination. The dentist becomes adept at sizing up the patient and the area of the mouth involved. Legal considerations require that the examination be recorded. For the beginner the examination should be stylized and recorded in some detail. Examination is divided into several portions.

History is divided basically into the chief complaint, present illness, past history, and family history (see Chapters 1 and 27). To intelligently assess the problem an adequate knowledge must be obtained of both the background of the patient and of the present complaint. No problem is so simple that it cannot cause serious injury or death under the wrong circumstances. However, under apparently normal circumstances in which no diagnostic problem needs to be fathomed, the practitioner asks a few leading questions rather than attempting to write a complete, hospital-type history. The patient is asked if he has had major operations or illnesses, when he last was examined by his physician, if there were positive findings, and what drugs he is taking now. He is asked whether he has allergies or a history of rheumatic fever, how many pillows he sleeps on, and if he has difficulty climbing steps. Most offices used a rather sophisticated medical history form that obtains a good history of past and current systemic and oral problems. The form is completed by the patient in the waiting room and is followed by further questioning by the doctor to clarify positive findings.

Clinical examination consists of visual evaluation (color, swelling, and condition of tooth and surrounding structures), palpation and percussion, instrumentation, and vitality tests. The tooth in question is examined closely. In addition, adjacent teeth and surrounding structures are examined carefully for problems that may be pertinent. The overhanging margin of the restoration on the next tooth that will fracture on extraction, osteoradionecrosis in the underlying jaw, or a fractured jaw under the loose tooth in a patient who has come from a

barroom fight should not be overlooked. A clinical survey of the general health status of the fully clothed patient in the dental chair also is a necessary art in the successful dental practice.

Radiographic examination is necessary, both preoperatively and postoperatively. Many conditions that could not be diagnosed otherwise are thus revealed, such as the curved root, the large cyst, a new abscess, or carious exposure of the pulp on an adjacent tooth that was not present on radiographs made several years earlier. The man whose jaw was fractured in the fight will sue when he becomes sober, claiming the jaw was fractured during the extraction, unless a preoperative radiograph record exists. A postoperative radiograph is equally important for clinical evaluation as well as for record purposes. It might be necessary to prove that a fracture received by the patient convalescing in a nightclub was not sustained during the extraction. With better radiographic procedures and protection, there is negligible radiation associated with these radiographs. However, children and pregnant women often are not given postoperative radiographs after uncomplicated procedures.

Blood pressure determination in the dental office has provided a service to the dentist in making him or her aware of the patient's hypertension and to the patient who often is not aware of his hypertension.

Laboratory tests are necessary adjuncts to diagnosis and management. Some tests, such as urinalysis, can be done in a well-equipped office, but most tests are done in a laboratory. Tests for bleeding are not done accurately in the office. If such tests are indicated, they should be done in a laboratory, in the hospital, or in the physician's office. Although such tests are expensive and time-consuming, there should be no hesitancy in ordering them if they are indicated.

Screening tests for diabetes and hemoglobin level are available from commercial firms in the form of treated paper strips. A service is performed if every dental patient is screened yearly, particularly if he does not obtain a yearly physical examination, since unknown cases of diabetes and anemia are thereby discovered in the dental office and referred to the physician for treatment.

Indications and Contraindications for Extraction

Indications

Any tooth that is not useful in the total dental mechanism is considered for removal.

1. Pulp pathologic conditions, either acute or chronic, in a tooth that is not amenable to endodontic therapy condemns the tooth. A tooth that is not restorable by dental procedures can be considered in this category, even if a pulp pathologic condition is not demonstrable.

2. Periodontal disease, acute or chronic, that is not amenable to treatment may be cause for extraction.

3. Traumatic effects on the tooth or alveolus sometimes are beyond repair. Many teeth in the line of jaw fracture are removed to treat the fractured bone.

4. Impacted or supernumerary teeth often do not take their place in the line of occlusion.

5. Orthodontic consideration may require the removal of fully erupted teeth, erupting teeth, and overretained deciduous teeth. Malposed teeth and third molar teeth that have lost their antagonists can be included.

6. Devitalized teeth, radiographically negative, have been removed as a last resort at the request of the physician because of the possibility that they are foci of infection, although this concept is considered extremely questionable today, mainly because neither the dentist nor the physician can diagnose accurately whether such infection is present.

7. Prosthetic considerations may require the removal of one or many teeth for design or stability of the prosthesis.

8. Esthetic considerations at times transcend purely functional factors.

9. There may be a pathologic condition in surrounding bone that involves the tooth, or treatment of the pathologic condition may require removal of the tooth. Examples are cysts, osteomyelitis, tumors, and bone necrosis.

10. Teeth "in line of fire" of planned therapeutic radiation to a nearby area are removed so that a supervening osteoradionecrosis of the bone will not be complicated by radiation caries or by necrosing pulps and their sequelae.

Contraindications

Few conditions are absolute contraindications for extraction of teeth. Teeth have been removed in the presence of all types of complications because of necessity. In these situations much more preparation of the patient is necessary to prevent serious damage or death or to obtain healing of the local wound. For example, the injection of a local anesthetic, let alone the extraction of a tooth, can cause instant death in a patient in an Addisonian crisis. Surgical intervention of any kind, including exodontics, may activate systemic or local disease. Therefore, a list of relative contraindications is given. In some instances these conditions become absolute contraindications.

Local contraindications. Local contraindications are associated mainly with infection and, to a lesser extent, with malignant disease.

1. Acute infection with an uncontrolled cellulitis must be controlled so that it does not spread further. The patient may exhibit a toxemia, which brings complicating systemic factors into consideration. The tooth that caused the infection is of secondary importance at the moment; however, to better control the infection, the tooth is removed as soon as such removal does not endanger the life of the patient. Before antibiotics became available the tooth was never removed until the infection had become localized, the pus was drained, and the infection had subsided to a chronic state. This sequence of events took much longer than the present method of removing the tooth as soon as an adequate blood level of a specific antibiotic had brought systemic factors under control.

2. Acute pericoronitis is managed more conservatively than other local infections because of the mixed bacteriologic flora found in the area, the fact that the third molar area has more direct access to the deep fascial planes of the neck, and the fact that removal of this tooth is a complicated procedure involving ossisection.

3. Acute infectious stomatitis is a labile, debilitating, and painful disease, which is complicated by intercurrent exodontics.

4. Malignant disease disturbed by the extraction of a tooth embedded in the growth will react with exacerbated growth and nonhealing of the local wound.

5. Irradiated jaws may develop an acute radio-osteomyelitis after extraction because of a lack of blood supply. The condition is severely painful and may terminate fatally.

Systemic contraindications. Any systemic disease or malfunction can complicate or be complicated by an extraction. These conditions are too numerous to list. Some of the more frequently encountered relative contraindications are as follows:

1. Uncontrolled diabetes mellitus is characterized by infection of the wound and absence of normal healing.

2. Cardiac disease, such as coronary artery disease, hypertension, and cardiac decompensation, can complicate exodontia. Management may require the help of a physician. Usually a postinfarction patient is not subjected to oral surgery within 6 months of his infarction.

3. Blood dyscrasias include simple as well as more serious anemias, hemorrhagic diseases such as hemophilia, and the leukemias. Preparation for extraction varies considerably with underlying factors.

4. Debilitating diseases of any kind make patients poor risks for further traumatic insults.

5. Addison's disease or any steroid deficiency is extremely dangerous. The patient who has been treated for any disease with steroid therapy, even though the disease is conquered and the patient has not taken steroids for a year, may not have sufficient adrenal cortex secretion to withstand the stress of an extraction without taking additional steroids.

6. Fever of unexplained origin is rarely cured and often is worsened by extraction. One possibility is an undiagnosed subacute bacterial endocarditis, a condition that would be complicated considerably by an extraction.

7. Nephritis requiring treatment can create a formidable problem in preparing the patient for exodontics.

8. Pregnancy without complications present no great problem. Precautions should be taken to guard against low oxygen tension in general anesthesia or in extreme fright. Obstetricians hold varied opinions regarding the timing of extractions, but they usually prefer

that necessary extractions be done in the second trimester. Menstruation is not a contraindication, although elective exodontia is not done during the period because of less nervous stability and greater tendency toward hemorrhage of all tissues.

9. Senility is a relative contraindication that requires greater care in overcoming a poor physiologic response to surgery and a prolonged negative nitrogen balance.

10. Psychoses and neuroses reflect a nervous instability that complicates exodontics.

The Office and Equipment

The chief difference between the office devoted solely to oral surgery and the one designed for general practice is the lack of fixed equipment around the chair in the former. In the exodontist's office the space on the left of the chair, usually occupied by the dental unit and cuspidor, is left vacant so that the assistant can stand there. The patient either expectorates into a sterilized stainless steel basin that is held in the lap or held by the nurse, or a suction machine is used. If suction is used, it is more powerful than that produced by the average dental unit and often is central suction produced by a large compressor located in another room or area. If bone burs are used, a high-speed handpiece attached to an engine or more often to a source of compressed gas is employed. A general anesthesia machine is brought near the chair after the patient is seated. Instead of a bracket table in front of the patient where its contents are in view, a Mayo stand is placed behind the chair.

Little change is necessary to adapt the general office for exodontics, provided that several basic considerations are included in the design. The cuspidor on the unit can be pushed back so that the assistant can work on the side of the patient opposite the operator. A good light on the unit will suffice for exodontics. If suction on the unit is inadequate and central suction is not available in the building, a mobile suction machine can be purchased. A Mayo stand should be available behind the chair so that the bracket table is not used. The sink need not be larger than the conventional size, but it should have knee controls. No sink in a dental office should have hand controls. Food pedals are difficult to clean under, and elbow controls sometimes get in the way.

Adequate storage space should be available for the sterile armamentarium, either out of sight in the room or in a nearby area. A place should be provided in the room for a sterile canister of sponges.

A radiographic viewbox should be placed in a prominent position facing the operator. This can be placed on the wall opposite the operator and to the left of the assistant. The room should contain an x-ray machine so that the patient does not have to move for postoperative or intercurrent radiographs.

Armamentarium

The more experience the exodontist acquires and the greater volume of work he or she sees, the simpler and more standardized the armamentarium becomes. Because the practitioner does not wish to lose time picking up several instruments, because it costs more money to add another forceps to the complete sets, and because each additional instrument must be handled

many times by the office personnel, he or she learns to do more with each instrument. Some practitioners boast that they can work with only two forceps. Although this philosophy seems foolhardy, since modern forceps are carefully designed to fit the anatomy of the various teeth, it nevertheless proves the ultimate in the "back pocket" philosophy.

Many practitioners have substituted universal forceps for paired (right and left) forceps. Another saving is the elimination of many, if not all, special forceps. Naturally, wide variation is found in individual likes and dislikes as well as in various techniques that call for specialized instruments. The beginner is well advised to start out with a basic armamentarium and to become thoroughly familiar with its use for at least a year before considering new or additional instruments.

An armamentarium that has proved satisfactory and complete over the years is as follows:

Forceps

Standard forceps No 1 for maxillary central and lateral incisors, canines, and premolars in some instances.

Standard forceps No 65 for maxillary root tips.

Standard forceps No 10S for maxillary molars.

Ash forceps, Mead No 1, for mandibular teeth.

Standard forceps No 16, cowhorn, for mandibular molars.

(Standard forceps No 150 for maxillary premolars and standard forceps No 151 for mandibular premolars can be added to these basic five forceps if desired. In addition, a maxillary and a mandibular child's forceps are desirable.)

Exolevers

Winter exolevers 14R and 14L, "long Winter exolevers", designed primarily for removing deep-seated mandibular molar roots.

Winter exolevers 11R and 11L, "short Winter exolever", designed for elevation of tooth roots near the rim of the alveolus.

Straight-shank No 34, "shoehorn exolever", designed for elevating roots as well as entire teeth.

Krogh exolever, Krogh 12B, designed for removal of third molar impactions.

Root exolevers Nos 1, and 3, Hu-Friedy, for removal of fractured root apices.

Many designs are made, which vary in delicateness. The beginner needs a fairly stout instrument to minimize breakage, but sharp, delicate instruments are better. They are made in sets of three: right, left, and straight.

(Potts exolevers R and L can be added for deciduous root tips.)

Surgical instruments

Bard-Parker handle No 3; No 15 blade used most frequently.

Rongeur No 4, universal, for cutting bone.

Bone file No 10.

Chisel, Gardner No 52, and Mallet, standard No 1, if chisel technique is used.

High-speed handpiece and burs if the bur technique is used.

Retractors, Austin.

Curets, Molt No 2, for universal use, including breaking periodontal attachment before exodontia; Molt Nos 5 and 6, same size, angled to right and to left; Molt No 4 for periosteal elevator and for removal of large cysts.

Needle holder, Mayo-Hegar 15-cm (A needle holder should be 15 cm long; a delicate hemostat is not adequate.)

Needles, 1/1-circle, cutting edge.

Suture material, silk No 3-0.

Scissors, tissue.

Scissors, suture.

Hemostats, small curved.

Allis forceps for grasping tissue.

Single-tooth forceps, Adson 11-cm, for delicate grasp of tissue.

College pliers.

"Russian forceps", V Mueller Co, 15-cm, for grasping teeth.

Several general observations can be made about purchasing equipment. Stainless steel equipment is more costly initially, but it holds up better. It is mandatory that two complete sets of instruments be bought, although an office devoted to exodontics will have many sets.

If an instrument is dropped or otherwise contaminated, time is too precious to await resterilization, even with high-speed autoclaving. If the bur technique for bone removal is employed, special care must be given by the operator and by all office personnel to provide a sterile handpiece for each procedure. Perhaps the greatest argument in favor of the chisel technique is that a sterile chisel is always available, whereas the general practitioner in a hurry might be tempted to employ the usual handpiece for what is considered to be just a small bone or tooth cut in the wound. Some of the worst infections in patients admitted to the dental service of a general hospital in the South Pacific World War II were the result of exodontics complicated by handpiece infection.

Sterilization

The best way to sterilize instruments is by autoclaving. Sharp instruments such as chisels and scalpels can be sterilized by the hot oil sterilizer. Cold solutions are used for storing sterilized instruments or for primary sterilization if many hours of undisturbed time can be given. The autoclave is used for sterilization of gauze sponges, cotton applicators, and linen.

Storage of the sterilized instruments is a problem. In the office devoted to exodontia a sterile table can be set up each day. This is not feasible in a general practice. Here each forceps should be wrapped in a linen towel large enough to fit the Mayo stand, and towel and forceps should be sterilized together. A pencil mark on the outside of the pack before sterilization will identify the instrument. Another technique employs a paper autoclave bag for each instrument. A complete tray of sterile accessory instruments covered with a towel should be available for more extensive surgery. The instruments can be sterilized on the tray if there is space to store the complete trays (which is the ideal way), or the instruments can be placed in a stainless steel box, which is more convenient to store and fits the smaller autoclave. In the latter case a sterile pick-up forceps is used to arrange the instruments on the Mayo tray, which has been covered with a sterile towel. Sharp instruments are placed in the autoclaved box or on the tray after they have been sterilized by other methods.

Instruments should be scrubbed with a brush and soap before being sterilized to remove blood and debris that would harden during the process. Hospitals do this with ultrasonic equipment. The hinge of forceps should be free swinging at all times. The patient lacks confidence in the operator who uses two hands to pull the handles of a frozen forceps apart just before an extraction. Rust has no place in the dental office.

The working points of all instruments should be sharp. Forceps with dull tips can be returned to the factory for refurbishing. A chisel that has been on a tray should be scrubbed and placed on the dentist's desk for inspection. If the chisel has been used, it should be sharpened on a stone so that it will cut hair. Scalpel blades and needles should be changed frequently if disposable items are not used.