

HOW ARE DENTURES MADE?

This short article will review “dentures” – definition, steps used to make a denture, materials used, time involved, composition of materials used in the denture base and the repair of broken dentures.

A denture is defined as a substitute for missing natural teeth and adjacent tissues. Dentures can be further divided into; **complete**: for replacement of all natural teeth; **partial**: a replacement denture which restores one or more, but less than all of the natural teeth; **immediate**: a complete or partial denture constructed for insertion immediately following the removal (extraction) of natural teeth; **interim, provisional or transitional** refer to dentures or partial dentures used for short periods of time as a “temporary” prosthesis; **over denture**: a complete or partial denture supported by retained teeth and gum tissue. The retained teeth often must be reduced in height and width to make room for the denture material. This may require that the tooth have endodontic (root canal) treatment prior to making the over denture.

The initial step used in the construction of a denture is the recording of an impression. This records the contours of the denture-bearing areas of either the maxilla (upper jaw) and/or the mandible (lower jaw). The impression is made with an impression material that is placed in the mouth in an impression tray while soft. After a few minutes in the mouth it becomes stiff or firm and is removed by the dentist. The impression is then used to produce a cast or ‘model’ of the recorded tissues. The preliminary impression is made for diagnostic purpose or for the construction of a custom impression tray for a working or final impression. This is used for making the master cast on which the denture bases are fabricated.

Complete dentures restore what is lost rather than reconstruct what is present. Thus, loss of anatomic reference points is noted; because many reference points have been lost, it is necessary to establish correct jaw positions in a vertical and horizontal dimension. This must be done precisely and in some cases is difficult. When the correct preliminary jaw relations have been established, the maxillary (upper) cast can be correctly oriented on an articulator. This is a device which is essentially a pair of mechanical jaws. The device incorporates an artificial jaw joint permitting the orientation of casts (models of jaws) in a manner that permits duplicating or simulating various positions and movement of the lower jaw.

Once the jaw relationship is reproduced and placed on an articulator, prosthetic (“artificial”) teeth can be arranged on the master casts. The master cast is coated with wax and the artificial teeth are arranged in the wax. The wax is contoured to mimic the gingival tissues or “gums” that surround natural teeth. The denture at this stage consists largely of wax and prosthetic teeth, usually made of plastic, and referred to as the trial dentures. These are used by the dentist to check the technical and aesthetic aspects of the dentures before they are finished. At the same time the patient can provide advice as to whether they feel that the appearance is as desired. If either is dissatisfied then appropriate records are taken and the trial dentures altered by the technician to correct the situation. Once this evaluation of the trial dentures is complete they are processed, usually by a dental laboratory to produce the final dentures. It should be noted that the trial dentures do not fit as well as the final prostheses as they have temporary bases at this stage.

In the dental laboratory, the teeth and wax are invested into a plaster mould. This is heated to eliminate the wax. An acrylic material (usually methyl-methacrylate) is then used to fill the void created by the elimination of the wax. Modern acrylic resins have excellent aesthetic properties and high strength. In addition, they are nontoxic, can be repaired easily, reproduce detail accurately and are dimensionally stable. Once the mould has been filled the acrylic resin is usually cured (processed) under pressure at 100°C. This process takes several hours. Once the resin is hard the mould is carefully removed in pieces to reveal the dentures, which are then trimmed and polished.

The time involved will vary with patient and dentists. Usually 5 visits are required for: (1) preliminary impressions, (2) final impressions, (3) recording jaw relations, (4) evaluation of the trial dentures (often twice) and (5) placement of the dentures. Thus five/six visits are generally necessary once the treatment begins. Initial visits may be required before the preliminary impressions are taken. The time between appointments is variable. Usually weekly visits should be anticipated.

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Broken dentures are easily repaired in most cases by a dentist and dental laboratory. Often it is necessary to send the denture to a laboratory for repair. This requires the patient to be without the denture for 24 to 48 hours. The laboratory will reassemble the broken dentures, with the aid of an impression, remove some of the old acrylic resin and add new resin material to bond the pieces together. Obviously, the more pieces to reassemble the greater the chance for error and improper fit. Patients should never repair dentures themselves. If the denture is not properly repaired the occlusion ("bite") or the fit of the denture can be adversely affected which can ultimately harm the tissues and increase the shrinkage of the supporting bone.

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