

Repairs and Additions to Removable Partial Dentures

The frequency of need for repairing or adding to a RPD should be minimized by:

- Careful diagnosis
- Intelligent treatment planning
- Adequate mouth preparations
- Effective removable partial denture design
- Proper fabrication of all the component parts.

Before undertaking a repair, it is essential to determine the cause of the fracture so that appropriate corrective measures can be undertaken, to replace fractured clasps and rests, or to add these components to a denture.

1. Place RPD in mouth and take alginate over impression.
2. When alginate set remove impression from mouth.
3. Before add stone, lubricate the inner surface of denture (acrylic) with Vaseline to prevent stone from getting in to the acrylic.
4. Block out any undercuts in acrylic with wetting tissue or paper towel.
5. Add stone to an impression to obtain a cast.
6. Where a component is to be added and the occlusion will influence the design or position of that component, an impression of the opposing dentition is also needed.
7. If it will not be possible to place the casts by hand, an interocclusal record will be required to allow the casts to be mounted on an articulator.

Figure 1: Alginate impression in a stock tray is required of the denture *in situ*.



Broken Clasp Arms

Among the common types of metal framework repairs associated with cast partial dentures is the repair of clasp components. Though repair procedures can be time consuming and expensive, these are sometimes the most possible solution to a broken prosthesis. The fit, function and esthetics of the

partial denture should be sufficient to permit a restoration of the clasp assembly rather than fabricating a new prosthesis.

The following are several reasons for breakage of clasp arms:

1. **Breakage may result from repeated flexure into and out of a severe undercut.** If the periodontal support is greater than the fatigue limit of the clasp arm, failure of the metal occurs first. Otherwise, the abutment tooth is loosened and lost because of the continued strain. This can be prevented by accurate surveying of the master cast and placement of the retentive tip of the clasp arm in the correct undercut depth.
2. **Breakage may occur as a result of structural failure of the clasp arm.**
 - a. A *cast clasp arm* will break at its weakest point due to improper form or careless finishing and polishing. This can be prevented by appropriate taper to flexible retentive clasp arms and uniform bulk to all rigid non-retentive clasp arms.
 - b. *Wrought-wire clasp arms* may eventually fail because of:
 1. Repeated flexure at the region where it exits from the resin base or the metal framework.
 2. Excessive adjustment during initial adaptation to the tooth or later re-adaptation.
 3. Notch or constriction that occurred as a result of careless use of pliers.
 4. Recrystallization of the metal at the point of origin during wax burnout, casting, or soldering procedures. This can be prevented by
 - (1) Avoidance of burnout temperatures exceeding 1300°F,
 - (2) Avoidance of excessive casting temperatures, and
 - (3) Electrical soldering to prevent the wrought wire from overheating.
3. **Breakage may occur because of careless handling by the patient.** This can happen as a result of distortion of the clasp caused by accidental dropping of the removable partial denture and removal of the partial denture by sliding the clasp arm away from the tooth with the fingernails.

**Note: recrystallization of metal is accompanied by a reduction in the strength and hardness of material.*

Repair by Soldering

Approximately 80% of all soldering in dentistry can be done electrically. *Electric soldering* permits soldering close to a resin base without removing that base because of rapid localization of heat at the electrode. The resin base needs only to be protected with a wet liner during soldering.

Torch soldering requires an entirely different approach. It is used when the solder joint is long or unusually bulky, and when a larger quantity of solder has to be used. Torch soldering cannot be undertaken to repair a removable partial denture framework that has resin denture bases or artificial teeth supported by resin because the excess heat will damage the resin bases and artificial teeth.

A broken retentive clasp arm, regardless of its type, may be replaced with a wrought-wire retentive arm embedded in a resin base or attached to a metal base by electric soldering. Often this avoids the need for fabricating a new partial denture.

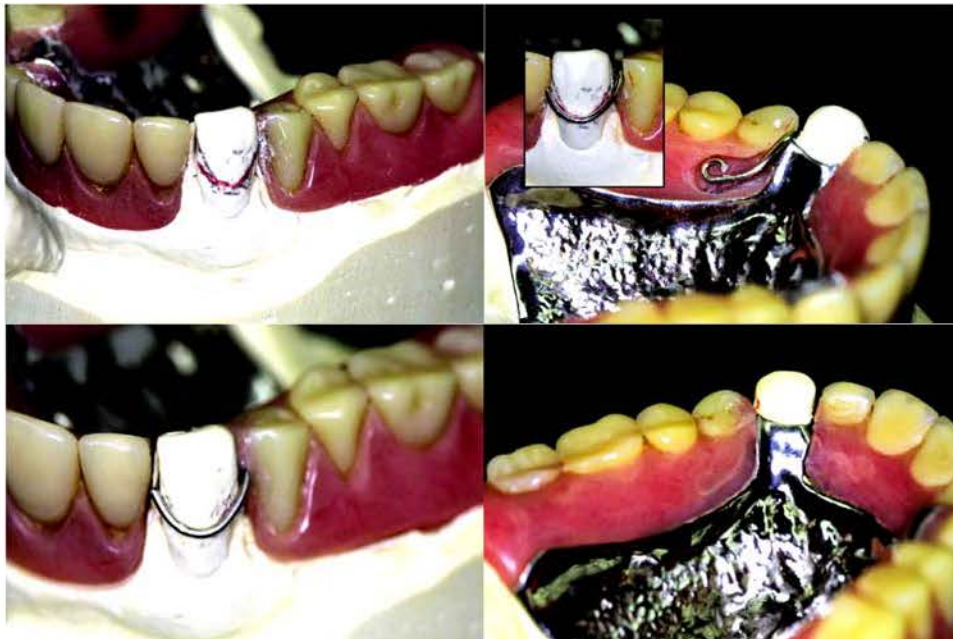


Figure 2: Fractured direct retainer on canine abutment. The reason for breakage is likely the long-term repeated flexure from movement associated with this 8-year-old distal extension prosthesis. The denture must be evaluated for prospective serviceability if the retainer arm is repaired. Often, the patient will best be served by replacing the denture with a new restoration. **A,** The cast produced from an irreversible hydrocolloid pick-up impression. The height of contour is shown in pencil, with a red line illustrating to the laboratory the location of repair wire (18-gauge). **B,** Clasp adapted to the designated line on the canine and fitted into the resin trough distal to the canine and palatal to the first and second premolars. Note the curvature placed at the end of the wire to prevent movement within the polymerized resin. **C,** Finished and polished wire repair from the buccal. **D,** Palatal view.

Fractured Occlusal Rests

Breakage of an occlusal rest almost always occurs where it crosses the marginal ridge.

- Improperly prepared occlusal rest seats not lowered sufficiently during mouth preparations is usually the cause.

- Thinning of the rest due to adjustment in the mouth to prevent occlusal interference may also lead to such failure.

Soldering may repair broken occlusal rests but it is necessary to correct the improperly prepared rest seat by deepening the preparation and/or relieving the occlusal interferences.

Distortion or breakage of other components – major and minor connectors

Distortion of the major and minor connectors usually occurs from

- Misuse by the patient. All such components should be designed with sufficient bulk to ensure their rigidity and permanence under normal circumstances.
- Weakened by adjustment to prevent or eliminate tissue impingement. Such adjustment at the time of initial placement may result from inadequate survey of the master cast or from faulty design or fabrication of the casting.

Any defect or fracture of the major or minor connectors must be replaced by casting a new section and then reassembling the denture by soldering. This occasionally requires disassembly of denture bases and artificial teeth. The cost and probable success must then be weighed against the cost of a new restoration. Generally the new restoration is advisable.

Addition of a new artificial tooth to a removable partial denture

The addition of a new artificial tooth may be required to fill a space created either by loss of a denture tooth or by extraction of a natural tooth. This is often best done by obtaining an alginate impression and interocclusal records so that the addition can be made in the laboratory.

Alternatively, it may be possible to rapidly achieve an acceptable result by building up a replacement tooth by direct additions of tooth-colored cold-curing acrylic resin to the denture at the chair side.

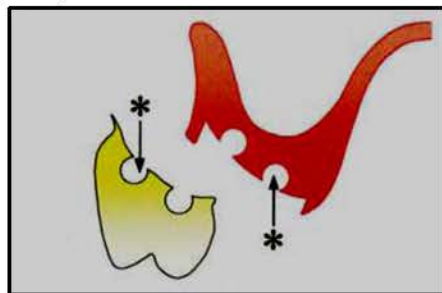


Figure 3: If a tooth has become detached from the denture but is still available, a rapid chair side repair can usually be effected using cold-curing acrylic resin. It is advisable to cut some form of mechanical retention in order to reinforce the chemical bond.

The attachment of teeth to metal connectors can be achieved by the creation of mechanical retention such as perforations or soldered wire loops.

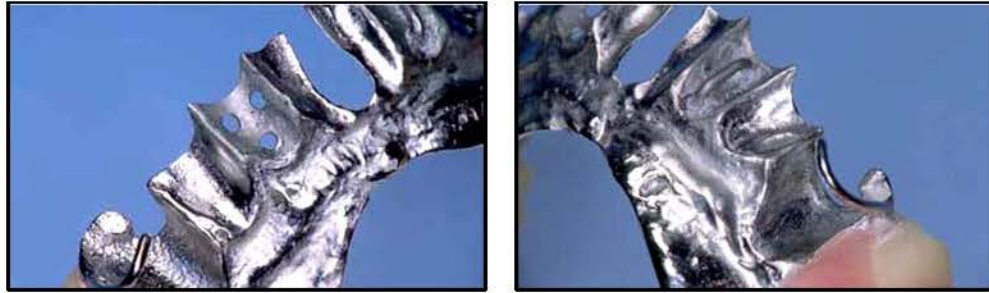


Figure 4: Mechanical retention (perforations or soldered wire loops)

Other types of repairs may include:

1. Replacement of a broken or lost prosthetic tooth.
2. Repair of a broken resin base
3. Reattachment of a loosened resin base to the metal framework.

Breakage is sometimes the result of poor design, faulty fabrication, or use of the wrong material for a given situation and if it occurs a second time after the denture has been repaired once before, then some change in the design, by modification of the original denture or with a new denture, may be necessary.