

# 11

## Initial prosthetic treatment

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**This article describes measures designed to provide short-term solutions to existing RPD problems and to establish an optimum oral environment for the provision of definitive prostheses.**

### In this part, we will discuss

- Repairs and additions
- Temporary relines
- Occlusal adjustment
- Interim prostheses
- Denture stomatitis

Initial prosthetic treatment may involve modification of an existing denture or provision of an interim prosthesis as a preparation for the definitive course of treatment.

When modifying existing dentures the following points should be borne in mind. Firstly, as these dentures are commonly due for early replacement, modifications will not have to last for very long. Secondly, the patient will often be reluctant to part with the denture for the modifications to be carried out, particularly if it replaces anterior teeth. These considerations point to modification of the denture at the chairside wherever practicable. A range

of polymers for direct use in the mouth significantly increases the number of opportunities for adopting this approach. Their relatively short clinical life, usually measured in months rather than years, is not a problem where early replacement of the denture is anticipated.

### Repairs and additions

Before undertaking a repair it is essential to determine the cause of the fracture so that appropriate corrective measures can be undertaken.

**Fig. 1 — Clasps and rests**

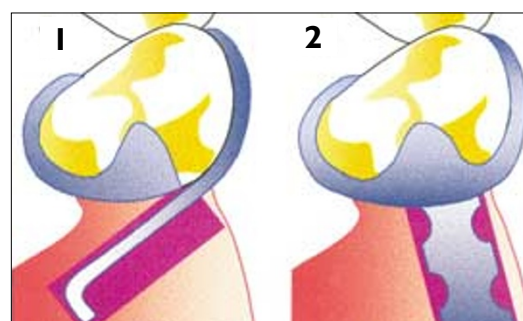
To replace fractured clasps and rests, or to add these components to a denture, an alginate impression in a stock tray is required of the denture *in situ*. Great care must be taken to ensure that the impression material does not displace the denture from its correct relationship to the surrounding tissues.

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. If it will not be possible to place the casts by hand into the intercuspal position an interocclusal record will be required to allow the casts to be mounted on an articulator.



**Fig. 2 — Clasps and rests**

A new clasp arm is usually produced by adapting a wrought stainless steel wire to the tooth on the cast and then attaching the wire to the existing acrylic base (1). Alternatively, an entirely new clasp assembly can be cast and tagged into the saddle of the denture (2). This latter procedure would normally be undertaken only if the existing denture is to be used for a considerable time.



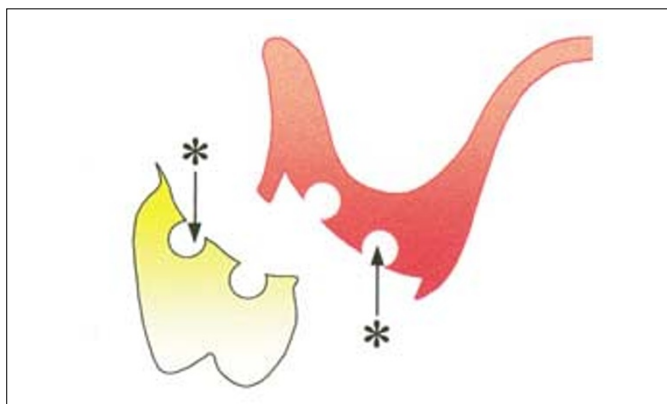
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### New publications:

All the parts which comprise this series (which will be published in the BDJ) have been included (together with a number of unpublished parts) in the book *A Clinical Guide to Removable Partial Dentures* (ISBN 0-904588-599) and *A Clinical Guide to Removable Partial Denture Design* (ISBN 0-904588-637). Available from Macmillan on 01256 302699



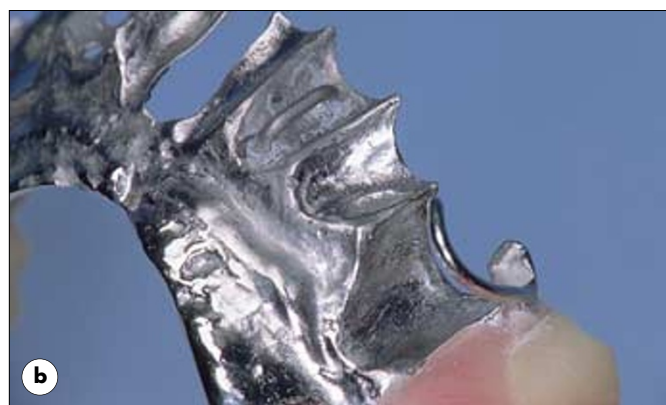


**Fig. 3 — Teeth**

If a tooth has become detached from the denture but is still available, a rapid chairside 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 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, as described in Fig. 1, 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-coloured cold-curing acrylic resin to the denture at the chairside.



**Fig. 4a and b — Teeth**

The attachment of teeth to metal connectors can be achieved by the creation of mechanical retention such as perforations or soldered wire loops. Alternatively, acrylic can be bonded to cobalt-chromium using meta adhesives.



**Fig. 5 — Connectors**

If the portions of a fractured acrylic denture can be relocated accurately outside the mouth, the clinician can unite them with a wire rod held on to the occlusal surfaces with sticky wax, or by applying a cyano-acrylate adhesive to the fracture surfaces. If possible the assembled denture should then be tried in the mouth for accuracy before being sent to the laboratory for repair.

Alternatively, a chairside repair using cold-curing acrylic resin is sometimes possible.

**Fig. 6 — Connectors**

If the portions of the denture do not relocate accurately outside the mouth they should be held in the best possible relationship by an application across the fracture line of cold-curing acrylic resin or impression compound. The denture may then be seated in the mouth while the bonding material is still pliable, and both portions held in their correct relation to the ridges and teeth until the denture is rigidly united. A laboratory repair can then be undertaken.

If apposition cannot be achieved, or if a metal connector is broken or bent, the denture will usually have to be remade.



**Fig. 7 — Flanges**

The addition or extension of a flange may be achieved using a non-poly methyl methacrylate resin, such as butyl methacrylate resin, which is adaptable directly in the mouth. However, as the colour stability of these resins is relatively poor, the technique is not ideal if the flange is visible and the denture is to be worn for more than a few weeks.

For the laboratory addition of a flange, an alginate impression in a stock tray is obtained of the denture *in situ*. The tray will usually need to be extended in the area where the flange is to be added using a suitable border-moulding material.



**Fig. 8 — Flanges**

Alternatively a border-moulding material, in this case tracing compound, can be added to the denture and shaped to conform to the area to be covered by the flange. A local wash impression is then taken within the modified flange. An over-impression of the teeth and denture *in situ* using alginate in a stock tray will facilitate the laboratory work.



## Temporary relining

The acrylic base of an RPD may be relined temporarily where loss of fit has resulted in instability or mucosal injury.

Temporary relining is carried out in the mouth using either soft or hard materials. When mucosal inflammation is present, the cushioning effect of the short-term soft materials (tissue

conditioners) is an advantage in that it distributes the load more evenly and thus promotes healing. The hard materials have been mentioned in Fig. 7.

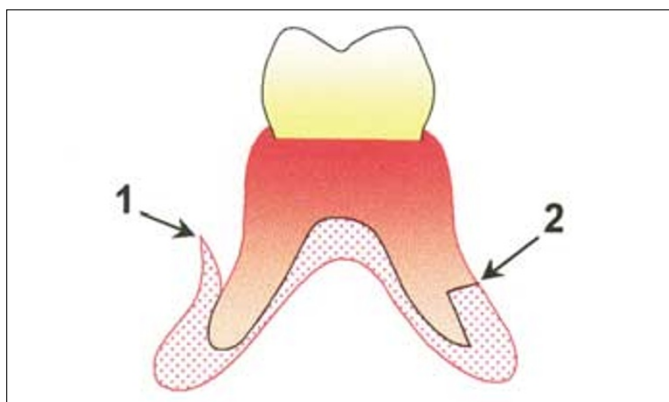
Before undertaking a temporary reline, preparatory adjustment of the denture is commonly necessary.





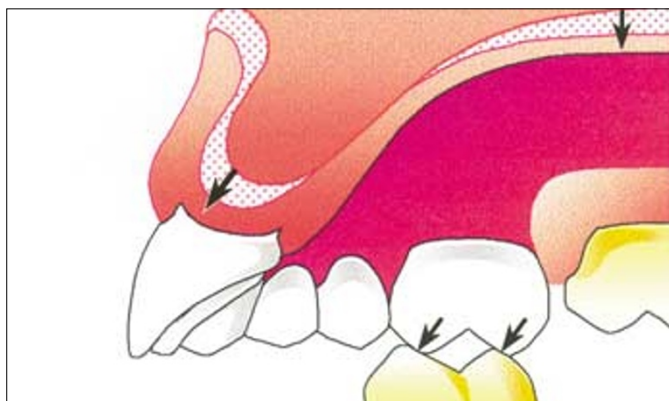
**Fig. 9 — Temporary relining**

A diagnostic alginate impression taken in the old denture is a quick and useful aid to assessing the fit of the denture and identifies pressure points that require adjustment before adding the reline material.



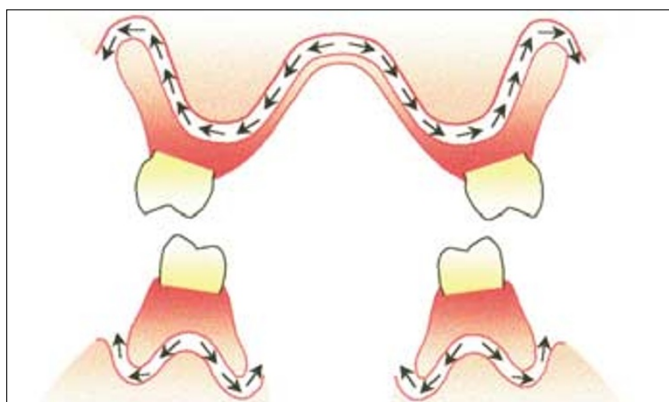
**Fig. 10 — Temporary relining**

If the denture is to be relined at the chairside any areas of under-extension should first be corrected by border moulding with a direct application of a chairside cold-curing resin. This resin may not have a very strong bond to the acrylic denture base and if allowed to form a feather edge (1) at the junction between the two materials, will tend to lift after a period of intra-oral use and will consequently traumatise the oral mucosa. This is prevented if a butt joint (2) is produced between the two resins.



**Fig. 11 — Temporary relining**

When carrying out a direct reline with a temporary material it is all too easy to fail to seat the denture correctly. This is particularly so in the case of a maxillary denture. If this occurs both the vertical and the horizontal occlusal relationships will be altered. It will also result in thickening of the connector leading to possible problems of patient tolerance and may alter the position of an anterior saddle to an unacceptable degree. These changes are likely to make the denture unwearable.

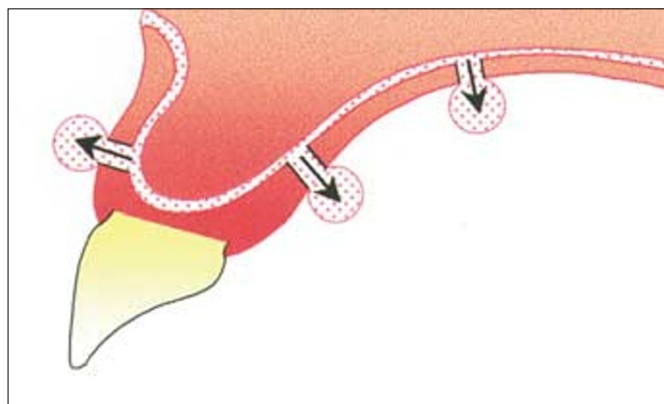


**Fig. 12 — Temporary relining**

There are a number of precautions that can be taken to reduce the chance of the denture being seated incorrectly. In a maxillary denture with extensive palatal coverage the escape channel for any excess reline material is long and tortuous and therefore the choice of a low-viscosity material is important. In the mandible, and in individual saddles, the escape channel is much shorter and so a higher viscosity material may be used.

**Fig. 13 — Temporary relining**

Alternatively, when a lining material of relatively high-viscosity such as butyl methacrylate resin is used, escape of the excess lining material from a maxillary denture can be helped by drilling holes into the palatal connector and sometimes the flanges.



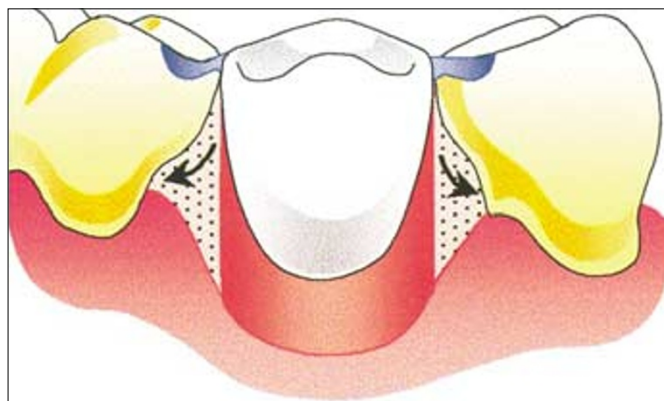
**Fig. 14 — Temporary relining**

Where the loss of fit is localised to the site of recent extractions, it is recommended that the temporary reline is restricted to that area — UL1 (21) and UL2 (22) in this example. The remaining, unmodified impression surface helps to locate the denture correctly against the residual ridges and abutment teeth. There will be a line of demarcation between the new resin and the original impression surface but minor smoothing of this junction is all that is usually required to achieve an acceptable result.



**Fig. 15 — Temporary relining**

If a hard reline material is being used it is important to appreciate that it may flow into undercut areas around the teeth and that consequently the timing of removal of the denture from the mouth is critical. Failure to remove the denture before curing is complete will result in the denture being locked into place. Removal of the denture will then only be possible if the offending acrylic resin is cut away with burs, a thoroughly time-consuming and frustrating business.



**Fig. 16 — Temporary relining**

Once the denture has been relined, any excess material must be removed from the polished surfaces and teeth. If the relining material is a hard resin the borders are trimmed and polished (maxillary denture).

Excess short-term soft lining material is trimmed on the polished surface of the denture so that the denture border consists of a smooth roll of the material (mandibular denture).



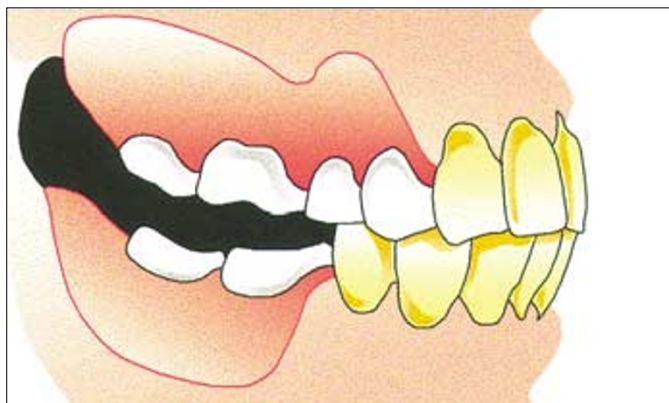


*Fig. 17 — Temporary relining*

A patient who has had a denture relined with a short-term soft lining material should be given specific instructions on how to clean the lining. Some of these materials are damaged by the use of alkaline perborate denture cleansers and others by alkaline hypochlorites. Unless the patient is warned of these incompatibilities rapid deterioration of the lining will occur.

As all these linings are added as a temporary measure, a positive decision must be taken by the dentist as to the next stage of treatment. For example, a short-term soft lining material needs

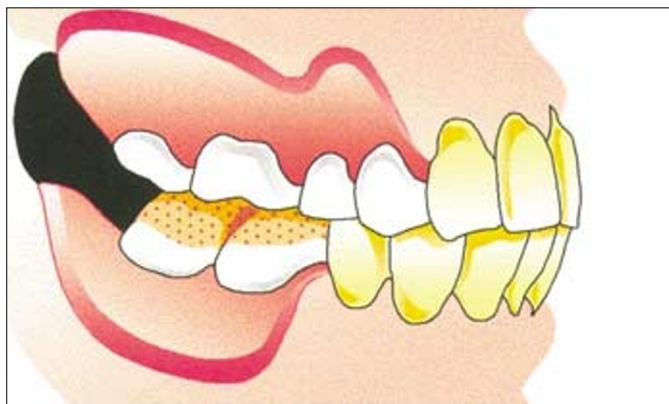
to be assessed at approximately weekly intervals and replaced periodically until mucosal inflammation has resolved. A new denture can then be constructed.



### Occlusal adjustment

*Fig. 18 — Occlusal adjustment*

The most common occlusal deterioration in dentures that have been worn for many years is loss of occlusal contact resulting from a combination of occlusal wear and sinking of the denture following alveolar resorption. Correction of the occlusion is desirable before constructing replacement dentures as adaptive mandibular posture and mucosal inflammation resulting from this deterioration are likely to interfere with successful treatment.



*Fig. 19 — Occlusal adjustment*

After the saddles have been relined, occlusal contact can be re-established by the addition of tooth-coloured cold-curing acrylic resin to the posterior teeth.

The fluid resin is applied to the occlusal surfaces of one of the dentures and allowed to reach the dough stage before the denture is inserted into the mouth. Petroleum jelly is applied to any opposing denture teeth and the mandible is gently guided along the retruded arc of closure until even occlusal contact is made at the appropriate vertical dimension. The denture is then removed from the mouth and the resin allowed to cure before refining the occlusion by selective grinding.

### Interim prostheses

An interim prosthesis may be constructed before the definitive denture for the following reasons.

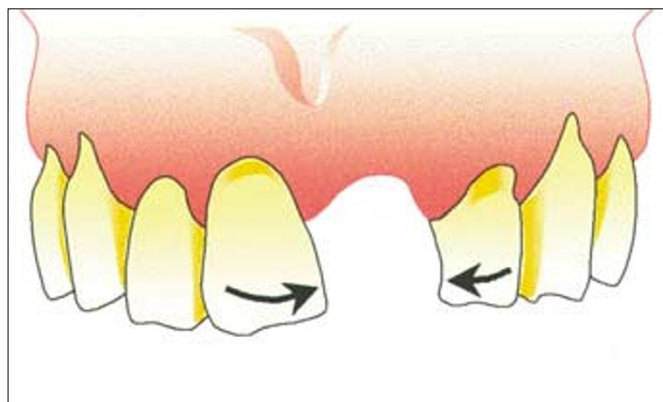
- Space maintenance and aesthetics.

- Improving patient tolerance.
- Preparation for advanced restorative treatment.
- Modifying jaw relationships.



**Fig. 20 — Space maintenance and aesthetics**

The loss of an anterior tooth may require rapid replacement with an interim denture, both for social reasons and to prevent reduction of the space by drifting and tilting of the adjacent teeth.



**Fig. 21 — Improving patient tolerance**

A small minority of patients find it very difficult, or even impossible, to wear a denture because of a pronounced retching reflex. The provision of a thin acrylic training base, which in the maxilla may be of horseshoe design, is useful in overcoming the reflex. The patient wears the base for increasing periods each day until tolerance is good enough to indicate that conventional treatment can proceed. When a training base of horseshoe design is used, the palatal extension can be increased in stages to allow progressive adaptation to palatal coverage which is as close as possible to the optimum.

In this instance the training base incorporates occlusal coverage in order to modify the jaw relationship in preparation for advanced restorative treatment (see below).



**Preparation for advanced restorative treatment**

A factor vital to the success of advanced restorative treatment is the ability of the patient to maintain a high level of plaque control. The use of an interim prosthesis will permit a careful evaluation of the oral and denture hygiene over a prolonged period before definitive treatment is commenced.

Advanced prosthetic treatment can fail because of a patient's unrealistic expectation of what a removable prosthesis can achieve, creating dissatisfaction and rejection of the treatment that has been undertaken. The provision of an interim prosthesis gives the patient experience of the limitations of such dentures; this experience, when combined with careful explanation

of future treatment aims and expectations, helps to create a more realistic frame of mind and readier acceptance of the definitive prosthesis.

**Modifying jaw relationships**

Adaptive changes in the jaw relationship may result from loss of teeth, the excessive loss of tooth substance or the congenital absence of teeth. These changes may require correction before restorative treatment can be undertaken and this may be achieved by the progressive occlusal adjustment of an interim prosthesis until the optimum occlusal relationship is determined.

**Fig. 22 — Modifying jaw relationships**

The planning of restorations for severely worn teeth is complicated by the uncertainty as to whether or not the increase in occlusal vertical dimension necessary to accommodate the required restorations will be tolerated by the patient.

An interim prosthesis is constructed to an occlusal height that appears from the initial assessment to be appropriate. It may then be progressively adjusted over several appointments. This allows a period in which the patient can gradually adapt to progressive, modest increases in occlusal height and finally confirms a height on which future treatment planning can be based.

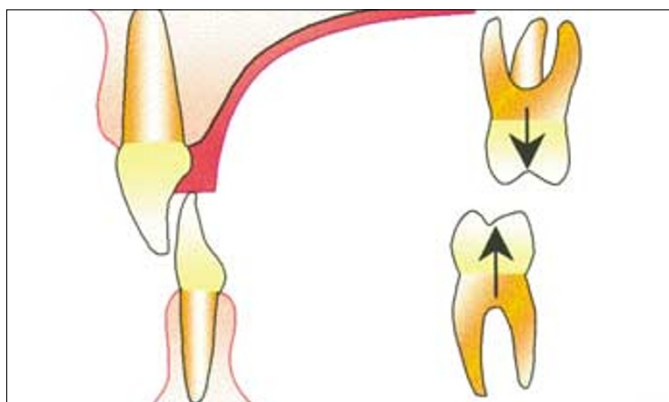




**Fig. 23 — Modifying jaw relationships**

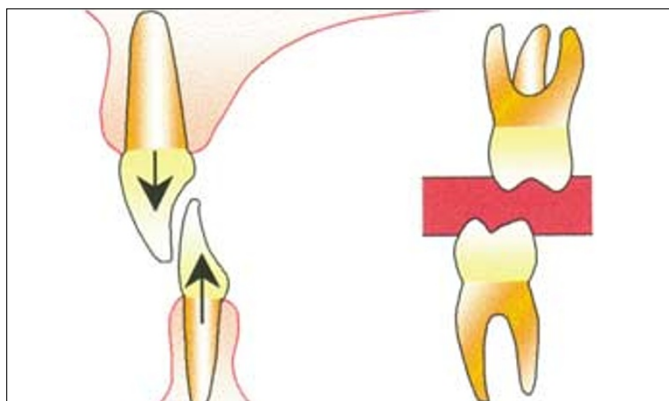
An interim denture can be helpful in patients exhibiting gingival trauma as a result of a deep incisal overbite.

A simple appliance with a palatal table can provide instant relief while a decision is being taken on the definitive solution whether it be orthodontic, restorative, periodontal or surgical.



**Fig. 24 — Modifying jaw relationships**

In the young patient the palatal table may also improve the situation by allowing further eruption of the posterior teeth and causing some intrusion of the mandibular anterior teeth.



**Fig. 25 — Modifying jaw relationships**

Prevention of gingival trauma should not be attempted with an onlay appliance covering only the posterior teeth as continued eruption of the anterior teeth may result in the original traumatic relationship becoming re-established.



### **Treatment of denture stomatitis**

**Fig. 26 — Treatment of denture stomatitis**

Denture stomatitis is a diffuse inflammation of the denture-bearing mucosa, often of multiple aetiology.



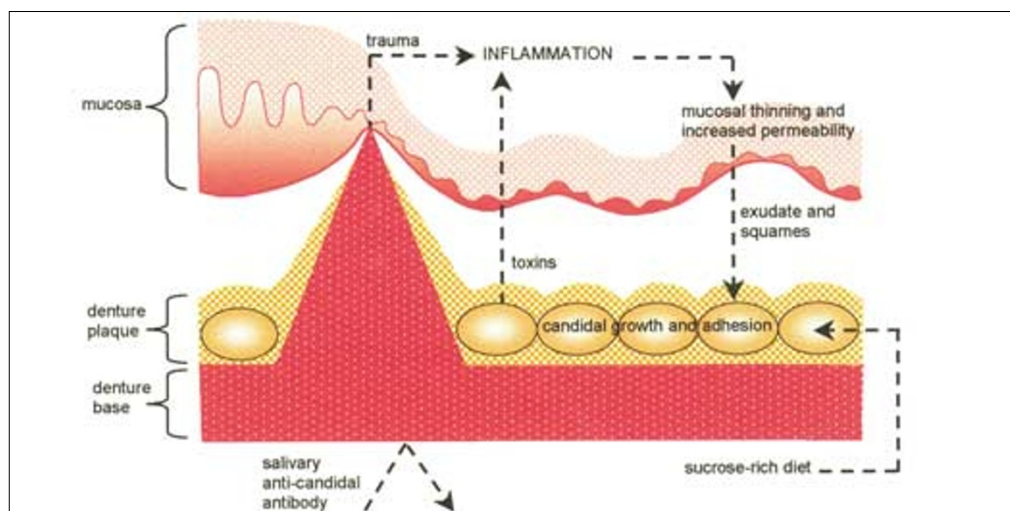
The commonest causes are an overgrowth of the fungus *Candida albicans* encouraged by poor denture hygiene and mechanical trauma from the denture. Systemic conditions, such as diabetes, deficiencies of iron, vitamin B12 or folic acid, and drug therapy, including broad-spectrum antibiotics, steroids and

cytotoxic agents, may predispose to denture stomatitis.

Treatment of the condition to achieve resolution of the inflammation and the associated mucosal swelling should be carried out before working impressions are obtained.

**Fig. 27 — Treatment of denture stomatitis**

Some of the many aetiological and predisposing factors, which may play a part in the pathogenesis of denture stomatitis are shown in the figure. The possible interaction of the various factors is complex and uncertain, but a possible scenario is as follows.



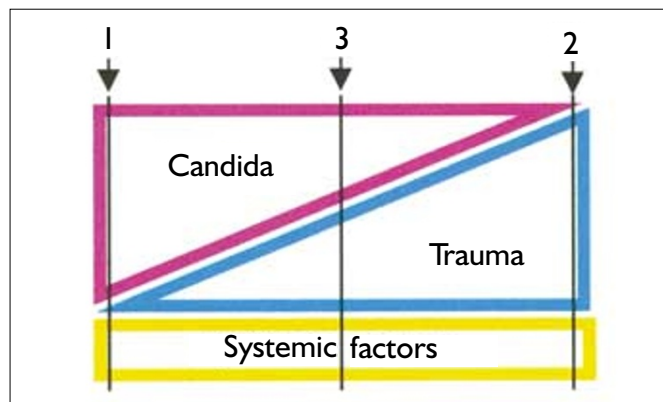
Toxins produced by the *Candida* cells left on the denture surface by deficient hygiene measures, together with trauma from the denture, initiate an inflammatory reaction. Thinning of the mucosa results in increased permeability and escape of inflammatory exudate. The exudate, together with desquamated mucosal cells, forms a favourable nutrient medium, which promotes the growth of *Candida albicans*. In addition, this exudate, and the sucrose-rich diet which may result from the dietary selection sometimes associated with the wearing of dentures, may

contribute to the condition by increasing the adhesiveness of the *Candida* cells, and thus encouraging the formation of denture plaque. As candidal proliferation occurs, the rate of production of potent toxins by the micro-organisms increases. The passage of these toxins into the tissues is facilitated by the thinning and increased permeability of the mucosa. Aggravation of the inflammatory response occurs and so a vicious circle is set up. Anti-candidal antibody is secreted in parotid saliva but the denture base may restrict access of antibody to the *Candida* cells.

**Fig. 28 — Treatment of denture stomatitis**

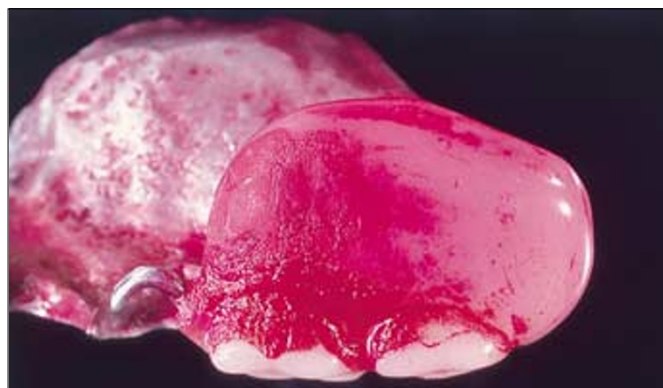
The aetiological factors may act alone or in combination as indicated here diagrammatically. In patient (1) the lesion is due to a proliferation of *Candida* organisms, in patient (2) to denture trauma, and in patient (3) to a combination of these factors.

The position of each denture stomatitis patient should be estimated on this aetiological scale so that the appropriate treatment can be carried out.



**Fig. 29 — Treatment of denture stomatitis**

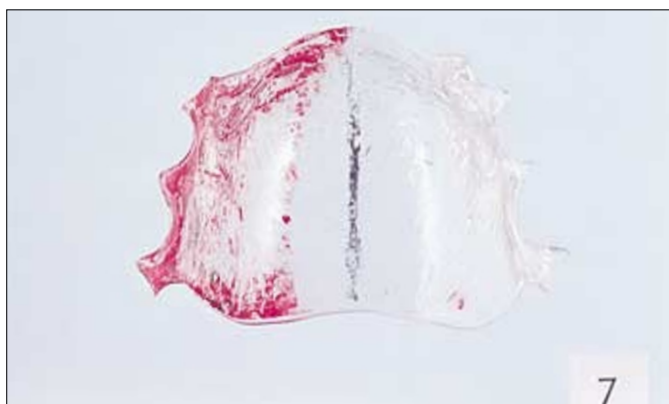
If the denture plaque control is poor the dentist should demonstrate the plaque to the patient by the use of a disclosing solution, explain the significance of the plaque and give instruction in how best to remove it.





**Fig. 30 — Treatment of denture stomatitis**

To clean the denture the patient should be advised to use a small-headed medium multi-tufted toothbrush, which gives good access to all parts of the denture and good adaptability to the surface. Any agent used with the brush should have a low abrasivity for acrylic resin. Soap is one such agent. It should be noted that many proprietary toothpastes, and even some denture pastes, contain abrasive particles which can damage acrylic resin.



**Fig. 31 — Treatment of denture stomatitis**

Acrylic dentures should also be immersed daily in a cleanser of the hypochlorite type, as these have been shown to be the most effective chemical agents for plaque removal. In this figure an acrylic plate carrying disclosed plaque has been partially immersed for 20 minutes in such a cleanser, rinsed and then re-disclosed. The immersed portion (right side) has been rendered plaque-free.



**Fig. 32 — Treatment of denture stomatitis**

Cobalt chromium dentures should not be immersed for long periods in hypochlorite cleansers because there is a risk of corrosion of the metal.

If trauma appears to be a contributory factor to the stomatitis, appropriate adjustments, such as occlusal correction and temporary relining, should be made to the denture as described in the earlier sections of this chapter. However, it should be borne in mind that as temporary linings with tissue conditioners make it more difficult for the patient to keep the denture clean, they should be avoided if possible. As both plaque and traumatic factors can be eliminated by leaving the denture out the patient should be advised to do this as much as possible.

If the lesion does not respond to these local measures the investigation of possible systemic factors should be undertaken. In such refractory cases, oral antifungal agents such as Amphotericin B, Nystatin or Miconazole may be beneficial. It should be noted, however, that these antifungal agents by themselves are of very limited value and unless the underlying cause of the denture stomatitis is eradicated the condition will recur when the antifungal agents are withdrawn.