



**Basic design  
of mandibular  
dentures**

In the mandible, under certain circumstances partial dentures should be given preference over bridge restorations. Failing that, long mandibular bridges should be divided up using 'torsion attachments'. Cemented bridges counteract the torsion in the mandible and restrict movement. In the worst case scenario they can break. This not only results in rapid loosening of the bridge, but also in breakage or chipping of the ceramic: patients suffer from headaches and jaw joint pain, the cause of which is often not determined.

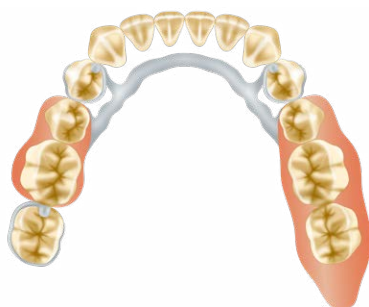
**In terms of the basic design, the general requirements for partial dentures, in the upper and lower jaw, should be observed:**

- Rigid, torsion-free base without overloading stomatognathic system
- Secure denture anchoring – avoidance or limitation of tilting movements
- Restoration and preservation of masticatory function
- Balanced relationship between aesthetics, phonetics and function
- Favorable distribution of the prosthodontic load (Number of rests, base and saddle extension)
- Periodontal prophylactic design (rinsability of interdental spaces, maintaining the minimum distances to the base)
- Sensible relationship between retaining and supporting elements, and the number of teeth to be replaced (Avoidance of overdesigned structures)

**Minor connector**

Minor connectors should always be designed so they can be rinsed thoroughly (self-cleaning), i.e. with sufficient space to the marginal gingiva.

In keeping with this requirement, it should be ensured that they do not run completely in the interdental space. Formations of niches with back-action and Bonwill clasps are especially unfavorable. Additional minor connectors to stabilize clasp arms are not necessary if high-quality partial denture alloys with appropriate strength values are used.



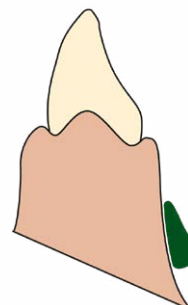
Provide back-action clasps with a flushable design

**Major connector**

As a rule, a sub-lingual bar is used for mandibular dentures. It adequately meets the requirements regarding periodontal hygiene. Its profile is semicircular, semi-oval or semi-pearshaped. According to experience, the profile cross-section must not be less than 3.4 x 1.8 mm after finishing because the stability needed for splinting the saddles is otherwise not ensured by the major connector. The mandibular construction should not cover the marginal periodontium of the existing teeth. The bar position often requires compromises. In many cases, the floor of the mouth depth is not sufficient, at least on the model. Causes may be errors in the molding process. The desired low bar position necessitates a mucostatic impression (nearly no pressure and immobilization of tongue).

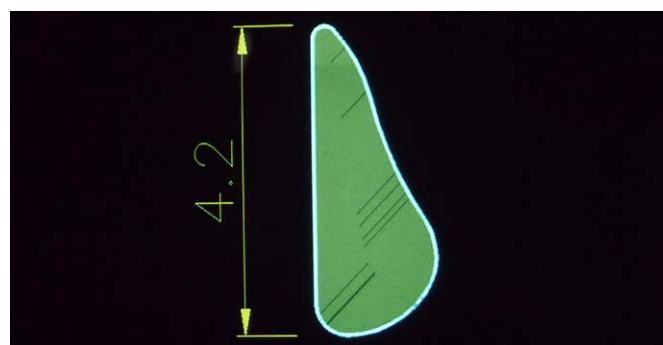
The minimum spacing between the upper bar edge and the marginal gingiva is ideally 4 mm or more. An 8 – 9 mm wide and/ or high functional sub-lingual area is ideal. In the case of an extremely flat floor of mouth or frenulum linguae attached at a high point, the bar profile can hardly be placed. To place it in a parallel position to the alveolar ridge or even horizontal may not be accepted by the patient. The mandibular denture must only permit vertical translation under masticatory pressure. Lateral movements lead to extremely sore spots on the alveolar processes.

The anatomical wax bar profile 4.2 x 1.8 mm has also gained good acceptance among patients.



Anatomical wax bar profile

It has a chamfered shape and a slightly rounded upper edge towards the tongue.



Anatomical wax bar profile – BEGO

Vertically sloping alveolar ridges are advantageous. Moderately inclined alveolar ridges tend to result in sore spots due to settling of the saddles. To relieve the bar, the master model is already underlined during preparation in this zone with blocking-out wax or tin foil.

The acrylic saddle should include approximately 2/3, of the retromolar trigone (pad). This zone hardly atrophies. Mandibular bars are designed in such a way that the mobility of the floor of the mouth and tongue is not restricted. In the case of extreme lingual tilting of the remaining anterior teeth or greatly undercut alveolar ridges, it may not be possible to find an acceptable path of insertion for the sub-lingual bar. In these very rare cases, a vestibular bar is indicated. However, this only remaining solution is used very rarely.

Generally bases made of CoCr alloys are tolerated by patients better than those made of acrylics. Because of their good thermal conductivity, they adapt themselves better to body heat. The dimensions and position of the base are specified by the dentist or at least determined together with him. A drawn design of the construction is appropriate in complicated situations, ideally on a study model. If, on the other hand, planning is left exclusively to the dental technician, key details are often not taken into account.

An important structural requirement placed on partial dentures is taking into consideration periodontal hygiene and caries prophylaxis aspects. This requirement is met by covering the highly sensitive marginal periodontium - only to the extent that it is absolutely necessary. The self-cleaning effect through the tongue and circulating saliva is provided for if the partial denture frame consistently runs at an adequate distance from the marginal gingiva. For the interdental papillae, free accessibility for saliva rinsing flow and massage effect is important.

#### Checklist for base design

- Clinical findings (condition of the mucous membrane, etc.)
- Number and distribution of the existing teeth and those to be replaced
- Value of the dental support, periodontal state – degree of mobility of clasped teeth
- Number, position and length of the saddle zones (toothbounded or free-end saddle)
- Saddle dynamics (leverage, resilience of the mucous membrane)
- Possibly from a state point of view, no second molars
- Bite situation and/or position
- Masticatory force – opposing jaw (toothed, partial, or full denture)
- Structure of the alveolar ridge (height), palate shape
- Position of the papilla incisiva, line of the middle palatal suture/ palatal raphe (maxilla)
- Muscle and ligament attachments: no functional impairment!
- Rigid, torsion-free connection of saddle parts and clasps
- Match design and material thickness to type of alloy

## Forms of mandibular base design

### Sub-lingual bar (lingual bar)



#### Stable sub-lingual bar made of WIRONIUM®

Preferred, suitable base design in mandible. Ideally runs at a distance of 4 mm from the marginal gingiva in the area of the mobile oral mucosa.

#### Modifications:

Supplemented by continuous clasp (continuous cingulum rest) or claw splint (embrasure hook). These solutions were originally chosen to be able to design the sublingual bar more delicately or support the front tilted in the lingual direction. Fortunately splinting clasps are hardly used nowadays.



### Sub-lingual bar

#### Vestibular, labial, or buccal bar

Rarely necessary, alternative bar line labially in relation to anterior teeth (vestibulum = vestibule). Indicated in the case of extreme lingual tilting or for aesthetic reasons as carrier of acrylic pads to build up greatly atrophied jaw areas. According to experience, if bar positioning is not taken into consideration and ligament and muscle attachments are not adequately left open, sore spots result.



### Vestibular bar



**Lingual plate (collar plate)**

Unfavorable base that extensively covers the marginal gingiva (periodontium). The primary purpose was to avoid a sub-lingual bar. This construction, which was frequently used in the past, often has inadequate dimensions and is not always dentally supported, is not used any more today.

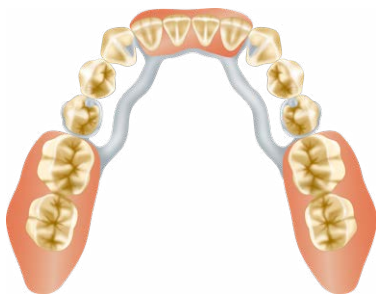
To avoid the sub-lingual bar, with anterior teeth in the lower jaw with a sufficiently long clinical crown, it is alternatively possible to create the saddle connection as a wide, continuous clasp. Such structures are often not stable enough.



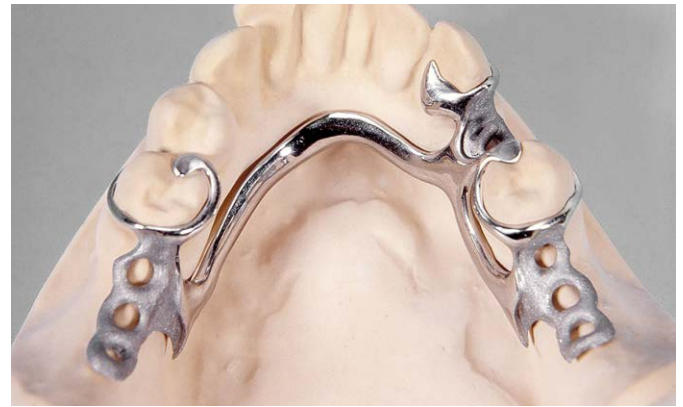
**Avoiding a bar by applying a wide continuous clasp**

**Saddles**

The suitability of the barely relocatable mucous membrane, for denture support is often not adequately taken into account in saddle positioning. As a result, saddles are often much too narrow and/or too short. Extensive saddle zones with uniform, close contact to the bearing mucous membrane relieve the abutment teeth close to the saddle in particular. Frequently, only few functional traces are visible at the occlusal surfaces of replacement teeth of free-end saddles. Even in view of this aspect, the transmission of forces in this area must not be ignored. Accordingly, saddle zones (Kennedy classes I and II) should always be extended over a broad area to the muco-labial fold or to the maxillary tuberosity/retromolar pad. The very little tendency to atrophy in these areas should be exploited with respect to denture support.

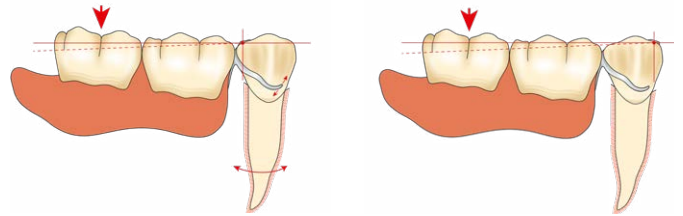


**Free-end saddles should be arranged extensively**



**WIRONIUM®-made denture with support away from the saddle**

In the case of support away from the saddle, a uniform, acceptable settling depth of the saddle results under masticatory pressure.



**Support near the saddle**

**Support away from the saddle**

A compression impression after frame trial fitting simulates the stress caused by masticatory pressure. It provides the prerequisites so the toothless jaw areas play a greater role in pressure absorption.