



Herbst bite-jumping hinge – but, of course!

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The Herbst bite jumping hinge was introduced more than 100 years ago and has established itself, ever since its rediscovery in the late 1970s, as a proven and recognized orthodontic treatment appliance. A correction of distocclusion cases can be achieved with this appliance within six to eight months - sometimes even after the patient stops growing. In this article, the authors describe the fabrication of a Herbst appliance with cast-cap splints.

Bite jumping hinges in combination with cast partial denture work

Keywords: Herbst bite-jumping hinge, Cast partial denture work, Biocompatibility, Treatment of distocclusion cases, Treatment safety, Patient comfort

Professor Emil Herbst, the inventor of the so-called Herbst bite-jumping hinge, first presented his invention at the 5th International Dental Congress in 1905 in Berlin. The main indication today is the correction of the skeletal Class II malocclusion.

The inventor himself described the appliance as a "retention hinge", which shows that it was not used exclusively to correct distocclusions.

In fact, the upper part of the appliance was intended to retain the upper dental arch. Moreover, center-line displacements of the lower jaw, nighttime bruxism as well as disorders of the temporomandibular joint had been corrected or treated with the Herbst bite-jumping hinge.

After the death of Professor Herbst in 1940, the appliance was largely forgotten. Beginning in the late 1970s, Professor Pancherz reintroduced the hinge to a broad audience through numerous publications.

Initially, the Herbst appliance was

fabricated with pre-formed crowns or bands. For some years now, cast-cap splints have seen increasing use.

Advantages of cast-cap splints

In our opinion, the procedure for cast cap splints offers some advantages. The Herbst appliance is well-tolerated by most patients due to the close similarity of the materials used.

In addition, separation prior to band positioning is not required. The appliance also offers individual design options, which means more comfort for patients.

Another advantage is the high stability, particularly when compared with simple bands, which can tear. In fact, cap splints are even superior to double bands in terms of stability.

The Herbst appliance is termed a "non-compliance" appliance, because the cooperation of the patient is not required. Due to its fixed anchorage, the appliance is also effective around the clock.

In the following, we will describe the fabrication process of a Herbst appliance using examples from the Dentaureum product range.

Description of the fabrication process

1. Preparing the models

Patient models are first measured in order to determine the contour height. Areas with undercuts are blocked out with wax for cast partial denture work (Fig. 1).

2. Duplicating

Patient models are duplicated with the pure silicone remaSil (Fig. 2 and 3). After twelve minutes, they can be removed from the mold. The duplicating molds are filled with the model casting investment material rema dynamic S (Fig. 4).

After a short setting time, the investment model is slightly heated at 120 °C / 248 °F in a preheating furnace. This step allows easy adaptation of the wax on the model.

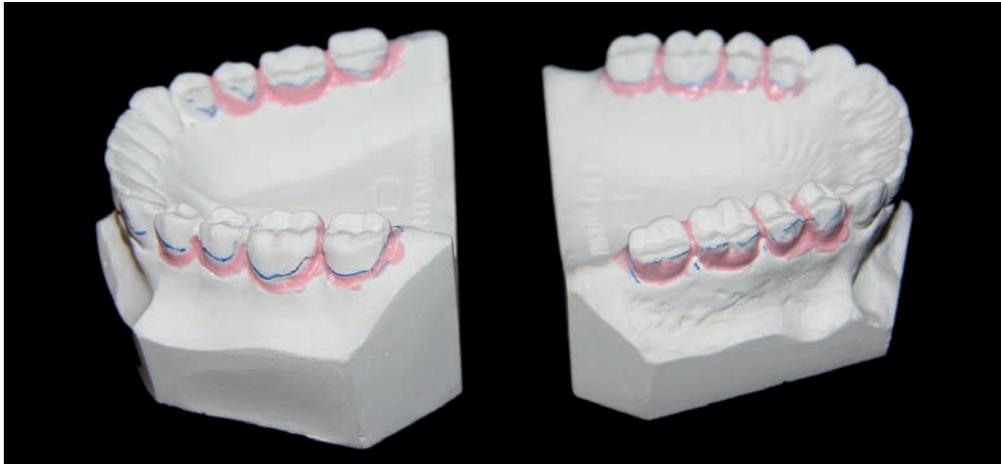


Fig. 1: Blocking out the undercuts with blocking out wax



Fig. 3

Fig 2 and 3: Duplicating the models with pure silicone

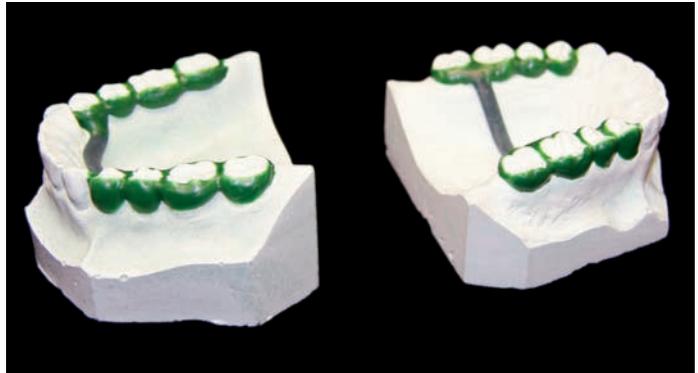


Fig. 4: Filling the duplicating molds with the model casting investment material

Fig. 5: Band-like wax application on the premolars and molars

3. Wax-up

Premolar and molar areas are surrounded with wax-mimicking bands (Fig. 5). Respective wax-ups are connected with a transversal bar. In some cases, it is advisable to forego this connection. This allows the orthodontist to cement the cast bands individually. The bases for the hinges are placed by means of a positioning aid.

4. Sprueing

3.5 mm-thick sprues can be used to sprue the wax-ups (Fig. 6). The casting funnel should be positioned about 5 mm above the occlusion level to generate sufficient casting force (Fig. 7). Then completely fill the muffle with investment (Fig. 8). rema dynamic S, investment material for cast partial dentures, is the investment used here.

5. Preheating and casting

The preheating of the casting ring is performed at 900 °C / 1652 °F. The cast partial denture alloy GM 800+, a biocompatible CoCrMo alloy, was used for the casting.

6. Trimming and fitting

Once the rings have completely cooled, the castings are devested and sandblasted with aluminium oxide (Fig 9). Sprues are removed



Fig. 6: Sprueing the wax-ups with 3.5 mm thick sprues.



Fig. 7: Positioning the casting funnel about 5 mm above the occlusion level.

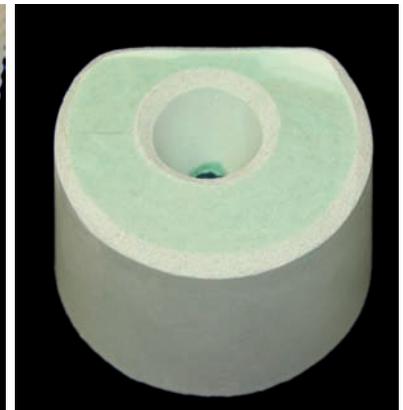


Fig. 8: The muffle is completely filled with investment



Fig. 9: Devested castings



Fig. 10: Finishing with sintered diamonds

Fig. 11: High-gloss polished restorations



and all areas are processed with sintered diamonds (Fig. 10).

After fitting to the model, the proper distance of the bands to the papillae areas must be verified in order to avoid irritations of the mucous membrane.

The restoration is then polished with Tiger Brillant polishing paste and a black brush on the polisher (Fig. 11). The hinge anchor is laser-welded to the high-gloss polished cap splints (Fig. 12).

The telescopic tubes are shortened according to the construction bite.

It is critical, when shortening the telescopic rods, that they extend into the buccal mucosa as little as possible. At the same time, the telescopic rods must be sufficiently long to prevent sliding out of the telescopic tubes when the mouth is wide open.

To increase the retention of the cement on the cast cap splints, it is recommended to sandblast the inner

part of the cast cap splints with aluminium oxide. The clinician can now use the cast Herbst appliance (Fig. 13).

Conclusion

By combining the Herbst bite-jumping hinge with cast partial denture work and laser welding, the patient benefits from a biocompatible treatment device. The transmission of forces occurs through the aggregate of all posterior teeth.

Irritations of the mucous membrane can be avoided through proper casting design. Cementation can be performed in a time-saving manner and a band failure virtually precluded with this treatment method. This is a rapid and reliable treatment option for patients and clinicians. 

*Thirty years of experience with the retention hinge, Prof. E. Herbst;
Magazine Zahnärztliche Rundschau, 43rd year, Issue 38, September 16, 1934.



Fig. 12: Connecting the base with the cap splints



Fig. 13: Herbst appliance, ready to use

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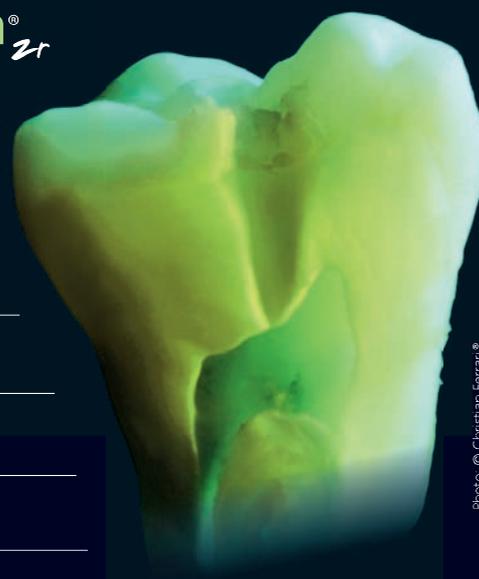


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