



Therapy of Class II Cases with the BioBite Corrector®

White Paper by

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Dr. Enrico Pasin attended the University of Witten/Herdecke in Witten (Germany) and received his doctor of dentistry in 2003. He begins 2005 his postgraduate studies in orthodontics. From 2006 -2008 he attended the University of Marburg (Germany) to continue his postgraduate studies in orthodontics under the heads of department: Prof. Dr. Jos Dibbets and Prof. Dr. Hans Pancherz. He graduated with a specialty in orthodontics in 2008. Dr. Pasin opened his private orthodontic practice in Bad Reichenhall, Germany, in 2009.

- 1998-2003 Studies of dental medicine at the private university of Witten/ Herdecke
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The Herbst is the most frequently used functional orthodontic appliance in the United States. Developed at the turn of the twentieth century, it revolutionized the treatment of Class II malocclusions. The new BioBite Corrector (figures 1a - 1b) is a functional orthodontic appliance developed to mitigate some of the shortcomings of the Herbst appliance while still delivering predictable clinical responses.

Fixed, functional orthodontic appliances, also called intermaxillary, non-compliant Class II appliances, are attached to a multi-bracket system in order to correct Class II malocclusions. They can be distinguished into three groups:

- Flexible appliances (e.g. Jasper Jumper)
- Rigid appliances (e.g. Herbst® appliance, BioBite Corrector)
- Hybrid appliances which use both rigid and flexible elements (e.g. Forsus™, Powerscope™)

While flexible appliances treat protrusion of the mandible by the use of spring resistance, rigid appliances do so by adjusting the length of the telescope hinge. As

their name would suggest, hybrid appliances correct protrusions using a combination of both rigid and flexible elements.

Both the traditional Herbst appliance and the BioBite Corrector belong to the group of rigid appliances. They don't feature any active presence of the force elements (coil springs) that are often used in other intermaxillary Class II non-compliance appliances. Instead, the BioBite Corrector employs the same functional principles as the Herbst appliance. It achieves anterior movement of the mandible by adjusting the length of the hinges using c-shaped spacers which are crimped to the thinnest telescope bars of the BioBite Corrector. By foregoing coil springs, it ensures a controlled, forward mandibular movement and prevents a proclination of the lower incisors.

The main advantage of the BioBite Corrector is that, as a fixed appliance, the lower jaw can be directly set into the ideal location. As a fixed appliance, it also guarantees compliance which can result in a more predictable outcome, reduced treatment times and predictable clinical results.

Herbst is a registered trademark of Dentaaurum, Inc.
Forsus is a registered trademark of 3M Company
Jasper Jumper & PowerScope are trademarks of American Orthodontics



figure 2a

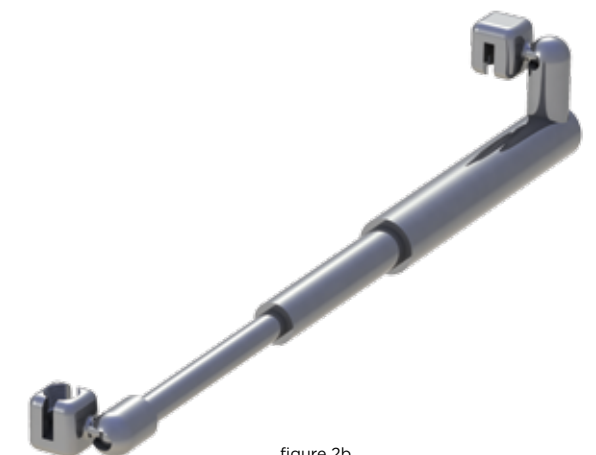


figure 2b

BioBiteCorrector (BBC)

For interested clinicians, the most important question is whether the BioBite Corrector can be used as standard treatment for all Class II malocclusions (like the Herbst), or whether it should only be thought of as an 'emergency-appliance' where treatment with removable functional appliances has failed. The only way to accurately answer this question is through clinical testing. A favorable outcome would depend on the device's susceptibility to damage/malfunction, and whether it could deliver a successful clinical outcome. Necessary reparations mainly include debonding of brackets, breaking of the orthodontic wire or breaking of the Class II appliance.

In 2007, at the University Clinic of Marburg (Germany) the first patients were treated with a prototype of the BioBite Corrector. Given that even a metal-cast, solid, and laser welded Herbst appliance can break, there was concern that the BioBite Corrector would be susceptible to similar physical failures under the stress of the jaw. However, this was part of the design premise. To prevent structural failure, the BioBite Corrector is designed with ball joints both in the upper and lower jaws that allow dynamic mouth movement (thus also improving wearing comfort) and reduce the load placed on the appliance in order to intrinsically prevent breakage.

The telescoping mechanics of the BioBite Corrector prevents the apparatus from slipping out of its tubes. The screws, spacers (figure 2b) and telescoping apparatus are manufactured of high-quality

(biocompatible) titanium, increasing the structural integrity and reducing the potential of mechanical failure. Along with mechanical vulnerability is the susceptibility for structural failure, and the possibilities of adjustment into bilateral Class I occlusion. Flexible appliances can close the jaws in habitual occlusion if the force of the coil spring is overcome by the patient, a situation often seen in strong brachyfacial patients.

Ease of use was another key consideration of the design. The BioBite Corrector uses a patient (and clinician) friendly, screw-driven connection in the upper and lower jaws. The screw-driven connection ensures a quick and easy fixation of the appliance. As a result, there are no preconditions for using it and it can be used with any bracket system.

The screw-driven design ensures the connection will not slide on the archwire. With the BioBite Corrector, there is no need for an anchor or L-pin connection to a headgear tube as is often the case with Class II non-compliance appliances. Attachment to the wire is achieved via the crimping effect of the screw. The vertical orientation of the slot prevents the screw body from loosening from the archwire, even if the screw loosens. The fixed connection onto the archwire.

Both the hybrid appliances and the rigid component exerts a certain amount of mandibular pressure, thus the patient cannot close their jaws in habitual occlusion. Nevertheless, hybrid appliances cannot always ensure bilateral



figure 2a



figure 2b

neutral occlusion after fixation. That's because the coil spring can cause an uncontrolled forward movement of the mandible. As a rigid appliance, the BioBite Corrector can push the mandible into a position of bilateral neutral occlusion, thus allowing it to function without coil springs.

Indications for the BioBite Corrector are similar to the Herbst appliance including treatment of distocclusions (or retractions) of the mandible, and treatment of mandibular midline shifts. Additionally, the BioBite Corrector can be used as an anchorage appliance for the closure of gaps in the posterior teeth of the lower jaw while correcting a distal occlusion (if necessary).

Due to the intrusive forces of the upper molars the BioBite Corrector is also suitable for cases with hyperdivergent jaw bases. The BioBite Corrector has been used successfully in adult patients receiving a combined orthodontic/surgical treatment.

Placing the BioBite Corrector

For easy handling, the BioBite Corrector comes pre-installed and does not need to be assembled from different parts. It is available in two sizes: standard (23mm extendable up to 57mm) for use in non-extraction cases, allowing for a wide mouth opening and small (19mm extendable up to 45mm) designed for usage in extraction cases after gap closure due to reduced distances.

The only precondition for successful fixation of the BioBite Corrector is a minimum .017 x .025 stainless steel archwire. In the lower jaw, the steel archwire must have a cinch back distal of the first or second molar. For this cinch back we recommend a Twister instrument. With the Twister you can easily bend the arch 90° without the risk of removing the bracket from the tooth (figures 3a - 3b).

First, the BioBite Corrector is fixed in the upper jaw and then the lower jaw. The upper jaw connecting element is fixed between the first molar and second premolar. It should not have any contact with the bracket of the first molar. The body slides on the archwire from gingival to occlusal and then the fixing screw is attached (figures 4a - 4b).

The lower jaw connecting element must then be fixed between the

canine and first premolar. The body is slid on the orthodontic wire in the same way and the fixing screw is attached. The connecting element should be situated as distal as possible with contact to the mesial side of the bracket of the first premolar. The connecting element must not have any contact with the canine bracket at all. The other side is then fixed in the same way.

After both sides are fixed, the lower jaw is guided back as far as possible until the BioBite Corrector joint is entirely closed. If there still is distal occlusion, the lower jaw can be shifted forward using distance spacers. These c-formed spacers (figure 2b) can be crimped on the thinnest telescope tube. Fine corrections can be carried out by shifting the connecting element (figures 5a - 5b).

Clinical Example

The current case shows a 13-year-old female patient. The treatment begins in 2012. The initial findings (figures 6a - 6e) show a profile of the Class II with a full cuspid distal occlusion. The overjet is 4mm and overbite is 5mm. The far, lateral x-ray (figure 6d) shows a brachio-facial structure with retro-inclined incisors in upper jaw. Treatment with the BioBite Connector was proposed to the patient. Within six months of her orthodontic treatment, the dental arches were shaped with a .019 x .025 stainless-steel archwire, increasing the overjet to 8mm. The figures (7a - 7d) show the situation before installing the BioBite Corrector. The minimum dimension for the insertion of the BioBite Corrector is .017 x .025 (stainless-steel archwire). Since



figure 3a



figure 3b



figure 4a



figure 4b



figure 5a



figure 5b

the system does not require any bending in the archwire (e.g. in the area of the lower jaw's canine), a classical straight-wire technique could be applied. In the lower jaw, the stainless-steel archwire must be directly bent distally from the 6th or 7th in order to avoid a protrusion of the lower jaw front.

During the introduction period of the BioBite Corrector in 2007, only simple Class II cases were treated (e.g. as an emergency appliance). Since then, the BioBiteCorrector's indications have been extended as the device's durability has been confirmed, predictability has been established and patients have expressed a preference over the Herbst appliance. It has become the standard appliance for complex Class II cases in several orthodontic practices as shown in the actual clinical examples.

Immediately after fixation of the BioBite Corrector, the overjet decreased to 2mm and there

was neutral occlusion at the canines (figures 8a - 8c). If using self-ligating or ligature-free brackets you should also use wire ligatures before fixing the BioBite Corrector in order to protect the closing mechanism. In the lower jaw, the brackets of the canines and first premolars should be protected in this way. In the upper jaw, ligatures on the bracket of the second premolar should be used as-well-as on the first molar if no band is used. In this case the BioBite Corrector was worn six months.

After removal of the BioBite Corrector, a protrusion and gaps in the lower front teeth can be sometimes be seen. The protrusion increased in this case by 5.9° (Figures 9a - 9g).

Conclusion

After working with the BioBite Corrector for a number of years, the conclusion is that it is a superior alternative to the Herbst

for Class II treatment in patients with permanent dentition. Even for complex Class II cases the appliance can be used with complete confidence. We have treated cover-bite malocclusions as-well-as adult patients who were scheduled for combined orthodontic/surgical treatment. The treatment time with the BioBite Corrector is short, it's been proven durable and the success rate is high. The correction of a distoclusion can be achieved— just as it is with the Herbst-appliance—by a combination of skeletal and dentoalveolar effects.

Dr. Enrico Pasin is an Orthodontist in Bad Reichenhall and the inventor of the BioBite Corrector. He is a graduate of Witten/Herdecke and Marburg and owns his own practice in Bad Reichenhall, Germany.



figure 6a



figure 6b



figure 6c



figure 6d

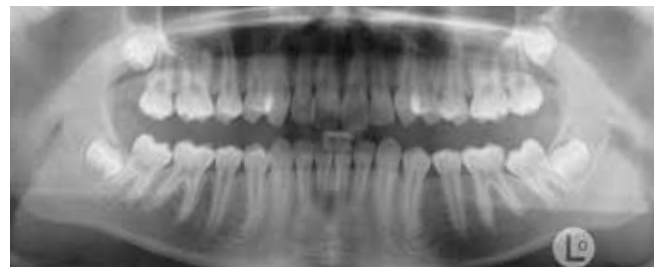


figure 6e



figure 7a



figure 7b



figure 7c



figure 7d



figure 8a



figure 8b



figure 8c



figure 9a



figure 9b



figure 9c



figure 9f



figure 9d



figure 9e



figure 9g