Case study

Experiences gained with
Experience™ mini Rhodium
and Ortho Connect:

Experts in Orthodontics
GC Orthodontics Europe GmbH
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Self-ligating bracket with convincing design and handling

Self-ligating brackets are an integral part of modern orthodontics, as they are associated with significantly shorter treatment times than conventional brackets among other things. In practice, the various systems do indeed have quite different handling characteristics, so that the changeover to another or new system is associated with a period of familiarization. If this is facilitated by training and if a new system convinces by its clinical handling, efficiency and esthetics, the decision to change products is worthwhile. Dr. Marcus Holzmeier is convinced of this. In this context, he reports on his positive experiences in using the self-ligating Experience™ mini Rhodium bracket (GC Orthodontics) on the basis of a case study.

Bracket systems are usually indicated in modern orthodontics as soon as complex, physical tooth movements have to be performed, e. g. in the case of pronounced rotations, displacements or gap closure or gap opening.1 Usually, a lack of oral hygiene or the express wish of the patient not to use fixed appliances are arguments against a fixed treatment method. In this case, other solutions need to be found. Once the indication for bracket treatment has been established, this can be performed with a variety of different systems and the appropriate specialist knowledge. In general, it is essential to know "one's" system used in practice, its values and behavior during tooth movements.

We prefer using self-ligating brackets in our practice, as there is less friction from the beginning of the leveling phase. As a result, tooth movements are performed with minimal forces, which increases the patient's wearing comfort due to reduced pain and simultaneously moves the teeth quickly and effectively – the treatment time can therefore often be shortened. In addition, the absence of elastics reduces plaque retention around the brackets and makes it easier to clean the patient's teeth.[2]

As longtime users of self-ligating brackets, we had already been looking for a better alternative to our used system for several years and have tested different self-ligating bracket systems during this time. It was important to us to find a bracket suitable for the MBT. 022" slot system generally used in the practice and to be able to work conceptually in one system. On the one hand, the new bracket should not differ too much from the previous system in terms of handling in order to keep the familiarization time for the team as short as possible, and on the other hand, the points that had previously led to irritation had to be solved better by the new bracket.

I also need an esthetically pleasing, relatively small bracket in order to meet the patients' demands. This basic requirement is fulfilled by the Experience™ mini Rhodium (GC Orthodontics), which we have been using successfully since autumn 2016 in all new cases with self-ligating brackets. In our opinion, other requirements for a bracket include a flat as possible profile, e.g. to avoid interfering with the occlusion in case of deep bites and without affecting the patient's cheeks and lips if possible. The bracket should have a sufficient mesio-distal width to provide good guidance and rotation control. The surface must allow the best possible sliding movement, i. e. friction, binding and notching effects should be as small as possible in the area influenced by the bracket material per se. We also place great emphasis on a sturdy clip that can be opened and closed easily and a bracket, the base of which provides a secure bond. It is annoying if the closure clip breaks or "wears out" during treatment and can no longer retain the archwire in the slot. Equally advantageous is the overall small size of the bracket, which despite its miniaturization integrates wings in order to be able to place a ligature or attach rubber chains if required. We chose Experience™ mini Rhodium, as it meets all the clinical requirements here. In addition, it benefits from improved esthetics compared to the predecessor bracket we used and can also be employed as a passive or active system, depending on the size of the archwire and deflection.

Experiences

The carefully considered switch to Experience™ mini Rhodium has proven its value. We have no more fractures of the closure clip and hardly any detached brackets: Due to the low depth, contact with the front of the lower jaw is rare and the micro-etched mesh pad base of the bracket appears to produce excellent bonding to the composite (in our case Transbond™ XT (3M Unitek) or Ortho Connect (GC Orthodontics)).

As is generally known, orthodontics tend to be more of a long-term treatment, and therefore it is not possible to completely replace a predecessor product at a fixed point in time; rather, it is a matter of phasing out and introducing bracket types. Since the introduction of Experience™ mini Rhodium into our practice, all new patients receive these as self-ligating brackets and all previously started treatments are completed with the predecessor product. As a result, we worked with both bracket types over a transitional period of approx. 2 years. In view of this additional logistical effort and the constant mental change between the systems, it is understandable that it was not an easy decision to switch to another bracket. Rather, this decision was preceded by collecting extensive information and discussions with colleagues.

The changeover was facilitated by a team training course conducted by one of the manufacturer's employees in our practice at the time the bracket was introduced. The team learned how to handle the new bracket in its original size as well as on an oversized demonstration model and how to open, close, etc. using a typodont. From the outset, we therefore avoided any anxieties with regard to the new system or faulty handling when changing archwires. The assistants appreciate the reduced effort required for clips compared to ligatures. Derotation, particularly in the initial phase, works excellently due to the bracket width (rotation control) and the secure hold of the closed clip.

In combination with GC Ortho Connect, the practice also benefits from the easy application of the system for bracket bonding: This one-component system does not require bonding, so that the bracket can be placed directly on the etched and dried enamel surface after application of GC Ortho Connect. Dosage of the correct amount is quickly practiced and works well. In addition, I also enjoy working with GC Ortho Connect because the brackets– despite the low viscosity of Ortho Connect, which allows penetration into the etched enamel profile – remain in a stable position before polymerization and excess material is easy to be removed. To date, the material has demonstrated high adhesive strength, which is clinically comparable to the endodontic gold standard Transbond XT (etching gel/primer/composite), which is also used in the practice.

We appreciate the option that the brackets can be ordered both individually or in pre-sorted trays per case. Another big advantage is the option of choosing between open and closed brackets. We prefer the open bracket as this allows good position control with the height gauge (see Fig. 13) as well as alignment with the Heidemann spatula (see Fig. 11). All brackets for the posterior region can be supplied with hooks so that we are flexible when placing elastic bands. The brackets in our practice are usually combined with the esthetic InitialloyRC and BioActive RC (GC Orthodontics) archwires. In our experience, a defined break occurs between the base and the composite material during removal of the bracket, so that the composite residues can be polished from the tooth surface as usual. We have not observed any chipping of enamel during removal to date.

Overall, we like using self-ligating brackets and in particular Experience™ mini Rhodium, as they make work considerably easier, for example, when opening and closing with the EM instrument, they accelerate some treatment steps (especially in the leveling phase at the beginning of the treatment) and are comfortable to wear and clean for the patient. In addition, the teeth move quickly and effectively due to the lower friction compared to conventional brackets, i. e. the total treatment time can often be reduced.3 Furthermore, the Experience™ mini Rhodium is beveled at the edges of the slot, so that binding effects are also reduced during translational movement.[4]

Case report

The following clinical case shows the incorporation of a multibracket appliance with self-ligating brackets. The banding of the 6's is not discussed in the following.

The then ten and a half year old patient presented herself for orthodontic treatment at the end of 2016. The extensive diagnostic measures, such as clinical examination, model analysis, OPG, FRS and photo analysis, exhibited a skeletal class III tendency. An alveolar midline shift of 1 mm to the right was visible in the maxilla. The maxillary arch exhibited a narrowing of the gap in region 13 with an elevated and protruding position of tooth 13. The first quadrant showed a pre-migration of 1.5 mm. In addition, tooth 12 had a cross bite and a misaligned position of the anterior teeth (Figs. 1-5).

Figs. 1-3: Intraoral images in occlusion before the start of treatment with a fixed appliance

Fig. 1

Fig. 2

Fig. 3

Figs. 4 and 5: Narrow positions and misaligned teeth

Fig. 4

Fig. 5

Treatment was initially initiated in March 2017 with plates, in the maxilla with protrusion segment from 12-22. This enabled us to use the phase of second dentition and protrude the maxillary front by about 5 degrees. The aim of the multi-bracket phase, which followed six and a half months later, is to adjust the teeth physically: rotation, tip and torque are precisely controlled and adjusted; the correction of the cross bite is performed including the correctly adjusted oral-vestibular root inclination. With the aid of the self-ligating brackets to be inserted, tooth 13 is quickly guided to the occlusal plane with as little friction as possible and thus accelerated movement, while at the same time being moved into a distally neutral position. Teeth 16 and 26 should be held in position.
An alternative would have been orthodontic treatment using removable appliances exclusively. However, plate apparatuses would have made it difficult to adjust both tooth 13 and physically shift tooth 12, as well as the correct adjustment of tip and torque. A further therapy option might have been an aligner treatment, whereby the treatment would have required at least one case refinement due to the not yet present teeth 15 and 25. In addition, 100% compliance is a prerequisite here for achieving difficult extrusion movements with aligners, such as those required for tooth 13. Due to this fact and also for reasons of cost, this alternative was excluded, as aligner treatment is to be paid for in full privately. After informing about the various treatment options, we therefore decided together with the patient and her mother to opt for multibracket treatment with the self-ligating Experience™ mini Rhodium brackets, based on the above-mentioned advantages of the system.
Initially, the teeth were cleaned intensively with a fluoride-free polishing paste. Fine pumice powder is also suitable for preparatory cleaning. The tooth enamel was then conditioned for 30 seconds with 37% phosphoric acid gel (Ortho Etching Gel; GC) in the area where the bracket bases were to be bonded (Fig. 6).

Fig. 6: Etching of the tooth enamel with phosphoric acid gel in the area of the brackets to be bonded

After spraying the gel and drying the etched tooth surfaces, the typical chalky white enamel surface was clearly visible (Fig. 7).

Fig. 7: The etched tooth surfaces impress with chalky white.

Now the brackets from the GC Tray (Fig. 8), which had previously been opened for the patient, could be clamped sequentially into the bracket forceps and the composite material applied directly from the Ortho Connect syringe to the bracket base by means of the attached disposable syringe (Figs. 9 and 10).

Fig. 8: Experience™ mini Rhodium Bracket Tray opened to the patient

Fig. 9

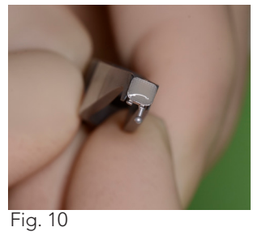

Fig. 10

The brackets were then placed on the teeth, positioned and the excess material was removed immediately with the Heidemann spatula (Figs. 11 and 12).

Fig. 11: The bracket can be aligned with the Heidemann spatula.

Fig. 12: After applying the bracket, excess composite is removed with the Heidemann spatula.

Figure 13 shows the alignment of a bracket using a height gauge exactly according to MBT system specifications.

Fig. 13: Alignment of the bracket using a height gauge

The composite was then cured (Fig. 14) for 20 seconds (depending on the treatment room Bluephase Style; Ivoclar Vivadent or SmartLite® Focus; Dentsply Sirona). Here, it is important to work with as high a light output as possible (for LED devices from 1,200 mW/cm2 upwards) that reaches well below the bracket base.

Fig. 14: Light polymerization for a total of 20 seconds per tooth

Finally, any excess material remaining after polymerization must be removed using a scaler or finisher. This was followed by the application of a fluoride-releasing, light-curing sealant to the buccal and labial surfaces respectively (Pro Seal; ODS/ polymerization for 20 seconds).
Finally, the first archwire could be inserted (Fig. 15). A 0.014" nickel-titanium (NiTi) was used as archwire material, which had previously been adapted on the model and was now inserted with the Weingart forceps.

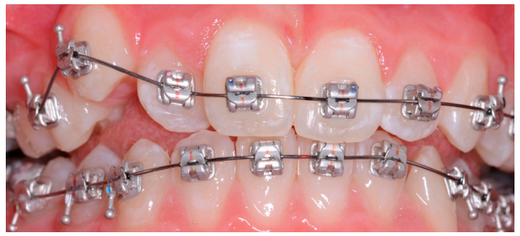

Fig. 15: The ligated archwire with closed bracket clips

The ends of the archwire were annealed and bent. Ligating proved very easy as the brackets were already open when delivered in the tray and the EM instruments for opening

and closing the brackets were included with the initial order by GC. Alternatively, it is also possible to very easily open or close the clip with a Heidemann spatula, by placing it on the opening groove and opening the clip with a twisting movement. Finally, the brackets were closed with the EM instrument, which again, is also possible with the Heidemann spatula or with the finger. The color coding disappeared after the first brushing of the teeth (Fig. 16).

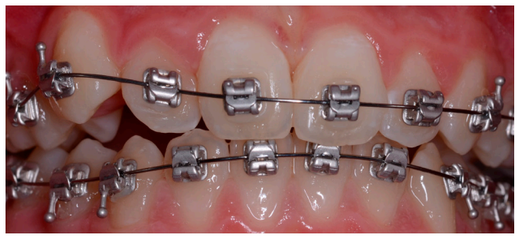

Fig. 16: Condition without color coding after the first brushing of the teeth

The very fast onset of alignment for tooth 13 (Fig. 17) was already apparent at the first change of the archwire after five weeks.

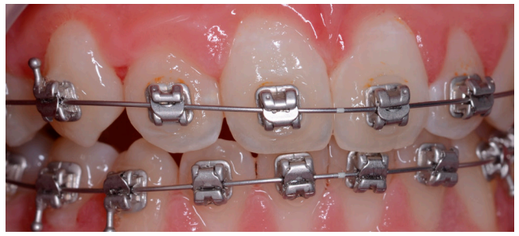

Fig. 17: Very fast leveling is already evident 5 weeks after insertion. This is particularly evident during the onset of alignment for tooth 13. Unfortunately, oral hygiene is inadequate at this time. Oral hygiene instructions were repeated together with giving remotivation.

The esthetic archwire InitialloyTM Rhodium, Medium, Form C, 0.018" (GC Orthodontics) was now used as archwire, which, in combination with the brackets, creates a relatively inconspicuous apparatus. Unfortunately, oral hygiene was not sufficient at this time due to the naturally occurring hindrance by the brackets, so that oral hygiene instructions were repeated as well as giving renewed motivation and recommending the use of Tooth Mousse (GC). A further five weeks later, the distinct tooth movement was impressive and oral hygiene was also improved (Figs. 18 and 19).

Fig. 18: A further 5 weeks later: marked tooth movement has taken place.

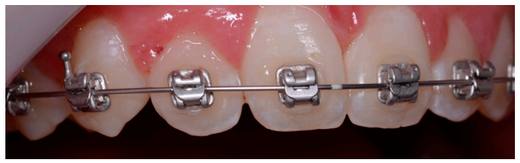

Fig. 19: Condition after changing the archwire 10 weeks after insertion of the brackets

With appropriate treatment progress, I expect a good and fast adjustment of teeth 12 and 13 as well as a correction of the midline shift in the maxilla. At this point in time, I expect to achieve neutral dentition within 12-15 months.

Conclusion

Experience™ mini Rhodium is a very comfortable bracket for the dentist and the patient: the markings and shape enable good positioning, the robust closing clip and the flat construction height with good width (rotation control) are convincing from the material side, as are the good MPa values for enamel adhesion in combination with GC Ortho Connect. In my opinion, another application advantage is that the handling during follow-ups and the associated change of archwires can be learned quickly by the team and implemented without errors.

Address for correspondence:
Dr. Marcus Holzmeier
Praxis Dr. Windsheimer & Partner
Postplatz 2
74564 Crailsheim (Germany)

Dr. Marcus Holzmeier
After his studies at the University of Erlangen, Dr. Marcus Holzmeier worked as a freelance dentist from 1999-2000. During his time as a product manager and clinical research associate at Heraeus Kulzer (2000-2004), he obtained his doctorate at the University of Mainz in 2002. Prior to obtaining the recognition as a specialist in orthodontics in 2007, he worked as a research assistant at the University of Erlangen from 2004-2007. Since 2007, he has been working as an orthodontist in the practice of Dr. Windsheimer & Partner in Crailsheim. He specializes in early treatment, functional orthodontics as well as adhesive technology. Parallel to his work in the practice, Dr. Holzmeier regularly works as an author and speaker and has been a lecturer at the Department of Orthodontics at the University of Würzburg since 2008. He is a member of the WFO and DGKFO.

1.Papageorgiou SN, Keilig L, Hasan I, Jäger A, Bourauel C: Effect of material variation on the biomechanical behaviour of orthodontic fixed appliances: a finite element analysis. Eur J Orthod. 2016 Jun; 38 (3): 300-307
2. Bock F, Goldbecher H, Stolze A: Klinische Erfahrungen mit verschiedenen selbstligierenden Bracketsystemen. Kieferorthopädie 2007; 21 (3): 157-167
3. Burrow S.J: Friction and resistance to Sliding in orthodontics: A critical review. American Journal of Orthodontics and Dentofacial Orthopedics. April 2009, Volume 135 (4): 442-447
4. GC Orthodontics brochure at www.gcorthodontics.eu

GC Orthodontics:
GC Orthodontics Europe GmbH
Harkortstraße2
58339 Breckerfeld
Tel.: 02338 801 888
Fax: 02338 801 777
www.gcorthodontics.eu
info.gco.germany@gc.dental

GC Orthodontics Europe GmbH
Harkortstrasse 2
D-58339 Breckerfeld
Germany

Direction commerciale
8, rue Benjamin Franklin
94370 Sucy en Brie
Tél. : +(49)2338 801-888
Fax : +(49)2338 801-877
info.gco.germany@gc.dental
www.gcorthodontics.eu

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