Instant Hydrostatic Splint

The registration of the physiologic condyle position using the Aqualizer technique

Instant relief and diagnosis of:
- TMJ (CMD) problems
- tension headache
- muscular tension
  - bruxism
  - back-pain

The First Aid Bite-Splint
**Product Description**

The Aqualizer’s fluid system creates perfect bite balance and stability through a minimally invasive approach to TMJ treatment. It works by allowing the muscles to automatically reposition the jaw to where it naturally works best. Restoring this balance is essential for TMJ pain relief.

Unlike other available dental splints, the Aqualizer self-adjusting oral splint is a TMJ treatment, which allows the body to unravel bite distortions and establish optimal systemic function and balance. The Aqualizer takes the uncertainty out of TMJ diagnosis and treatment. While other dental splints and TMJ treatment options can distort the jaw, causing TMJ pain, the Aqualizer facilitates relief through ideal occlusion automatically and naturally. The Aqualizer is also a perfect supplement in other medical disciplines besides dentistry. Today this device is integrated into physical therapy, osteopathy, orthodontic treatment, orthopedics and many other medical disciplines.

**How the Aqualizer works**

The Aqualizer is an application of a basic physical law of nature called Pascal’s Law, which states that an enclosed fluid will apply equalized fluid pressure regardless of where pressure is applied to the fluid. In other words, biting down on the Aqualizer causes the fluid to distribute bite forces evenly across the bite, reducing TMJ pressure and pain and ensuring relief. Aqualizer dental splints impose no preset changes. By contrast, they enable the body to naturally balance itself, resulting in TMJ pain relief and improved function.

**Anatomical Design – How does the Aqualizer stay in the mouth**

Due to its anatomical shape the Aqualizers adapts to the shape of the dental arch. The oral vestibule and the muscles of the upper lips and cheeks fixate the Aqualizer. The patient bites slightly on the fluid pads to keep the Aqualizer in position. The Aqualizer can also be used like a regular relaxation splint when sleeping.

**Using the Aqualizer**

The Aqualizer should be placed between the upper lip and the oral vestibule of the maxilla for a most comfortable position (Fig. 1-4). Instruct the patient to keep the fluid pads between the posterior teeth. Wearing an Aqualizer may stimulate the salivary glands. The patient should relax and rest their teeth against the fluid pads when swallowing. It is not desirable to clench. The Aqualizer should be worn symmetrically and not too far to the left or to the right. Simple insertion of the Aqualizer bite splint instantly creates a muscle-dominant functionally generated occlusion. This occurs because the Aqualizer facilitates muscle-dominated mandibular repositioning while it equalizes, axializes, balances, distributes, and makes simultaneous all occlusal forces.

Ask the patient to be aware of any change in sensation anywhere in the head, neck, shoulders, and upper back. Monitor the patient’s symptoms in your reception area every five to ten minutes for 30 to 60 minutes.

**Therapeutic effect**

The Aqualizer is a waterbed system to rest the jaw. The Aqualizer’s smooth, flexible surface permits the teeth to easily slide across it. The flexible fluid pads, positioned between the upper and lower occlusal surfaces, eliminate all tooth-to-tooth contact. The hydrostatic system supports the natural function of the muscles. Muscular imbalance will be balanced by improving the muscular coordination. The muscles respond instantly by moving the mandible into its most comfortable, least accommodated position. Generally within the first minutes, this occlusal-muscle harmony eliminates occlusally triggered facial jaw pain and muscle spasm. Chronic sufferers (as opposed to episodic) generally experience slower results. Patients should not continually bite with pressure on the Aqualizer, rather, the teeth should rest in a relaxed way so that the chewing muscles relax. If you bite too strongly on the Aqualizer you may break it. If this happens, the distilled water will run out and the Aqualizer will be unusable. Wear the Aqualizer for as few hours as necessary to relieve discomfort, either while sleeping or during daytime periods of stress or facial jaw pain.

**Instant Hydrostatic Splint**

The Aqualizer is a unique self-adjusting splint, which can be used instantly without any preparation. The water-based hydrostatic system adapts automatically to the anatomic characteristics of the patient.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
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<tbody>
<tr>
<td>1)</td>
<td>bend the Aqualizer to the right shape</td>
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<tr>
<td>2)</td>
<td>place the Aqualizer into the mouth</td>
</tr>
<tr>
<td>3)</td>
<td>keep the fluid pads between the posterior teeth</td>
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<tr>
<td>4)</td>
<td>check the vertical dimension of occlusion using Bausch Fleximeter Strips</td>
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</tbody>
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**H2O**

self-adjusting hydrostatic splint

anatomical design for comfortable use

balance of forces stabilizing the posture of the body

10kN 10kN

vertical dimension of occlusion 0.5-2 mm
The Aqualizer Models

The Aqualizer is available in three different models. All models are available in 3 different vertical dimensions of occlusion. The therapist has the choice to select the right Aqualizer-Model depending on physiological and therapeutic characteristics of the patient.

### Aqualizer Slim

- **Aqualizer Slim - high volume ≈ 3 mm** REF AQ 300
- **Aqualizer Slim - medium volume ≈ 2 mm** REF AQ 301
- **Aqualizer Slim - low volume ≈ 1 mm** REF AQ 304

This model has a good anatomical fit and slim bite pads for comfort. Irritation of the tongue and the gum are reduced. This Aqualizer is relatively stable when clenched. Parafunctional clenchers can destroy an Aqualizer in 1-2 days.

### Aqualizer Ultra

- **Aqualizer Ultra - high volume ≈ 3 mm** REF AQ 305
- **Aqualizer Ultra - medium volume ≈ 2 mm** REF AQ 306
- **Aqualizer Ultra - low volume ≈ 1 mm** REF AQ 307

The Ultra is an improved version of the Aqualizer designed for increased gum comfort and improved retention. It is used for average sized mouths. Because of the wider fit and wider side wings, this model can be worn in combination with brackets during orthodontic treatment.

### Aqualizer Mini

- **Aqualizer Ultra Mini - high volume ≈ 3 mm** REF AQ 308
- **Aqualizer Ultra Mini - medium volume ≈ 2 mm** REF AQ 309
- **Aqualizer Ultra Mini - low volume ≈ 1 mm** REF AQ 310

This model is a smaller version of the Aqualizer Ultra. The size is equal to size 1-S (small) of a dental impression tray. Depending on the jaw size, the Aqualizer Ultra Mini can also be used when molar teeth are missing.

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**What material is the Aqualizer made of?**
The Aqualizer consists of a stable polyamide film. The welded edges, which have contact with the gingiva, are protected with a soft layer of foamed polyethylene. The materials comply to the essential requirements of medical device Directive 93/42/EEC. The Aqualizer is filled with distilled water. If the Aqualizer bursts, distilled water will run out.

**Can the Aqualizer be swallowed?**
If the patient has a lack of a normal swallowing or gag reflex, it should not be used or only under medical supervision. The Aqualizer is used for almost 30 years. So far, no severe incidents have been reported. This is based on experience and feedback from the market.
High volume Aqualizers ≈ 3 mm vertical occlusion dimension are used when a patient has excessive freeway space or needs a greater vertical dimension to fill the space between the upper and lower occlusal surfaces. The higher volume causes a firmer feeling on some patients which can provoke some discomfort. Based on clinical experience with parafunctional clenchers/bruxers, the higher volume induces a better neuromuscular relaxation by increasing the vertical space.

Medium volume Aqualizers ≈ 2 mm vertical occlusion dimension are used by most patients (90 percent). Almost all patients can use medium volume.

Low volume Aqualizers ≈ 1 mm are for patients with inadequate freeway space (or those sensitive to anything in their mouths) who may find the minimal vertical dimension more comfortable. The Low volume Aqualizer is also indicated when using the neuromuscular bite registration technique.

A higher Aqualizer always causes a slight rotation of the condyle. An Aqualizer with less vertical dimension causes minimal rotation.

In determining a physiological position of the condyles as a possible reference position for a hard rigid bite splint or a possible therapeutic position for a restorative care, this effect should be considered.

Choosing the correct vertical occlusal dimension – Bausch Fleximeter Test

Before inserting an Aqualizer, the vertical dimension can be determined with a simple test. The patient bites with his molar teeth on a Fleximeter Strip. The other Fleximeter Strip is pulled by hand between the incisors. If there is any tactile contact between the incisors or canine teeth, the vertical space is still too low. Fleximeter Strips can also be combined together to simulate different vertical dimensions. Bausch Fleximeter-Strips, are available in sizes 1.0 / 1.5 / 2.0 mm.

Conditions for using an Aqualizer

The Aqualizer can only be used if there are enough premolar and molar teeth to create an occlusal balance. Missing antagonists will interrupt the floating action of the hydrostatic splint. A gap ≥ 5 mm can disturb the physical function and cause a blister in the Aqualizer. Existing gaps can be closed with a temporary prosthesis. For missing molars, for example tooth 36, an Aqualizer Ultra Mini can be used.
Occlusion and possible impacts of occlusal interferences to the patient

Occlusal interferences could be a possible etiological factor of a myoarthropathy. The occlusion is exposed to a constant change. Every restoration, extraction, prosthetic and orthodontic treatment changes the occlusion in static and dynamic occlusion.

Small occlusal interferences of just a few microns, are disruptive for the proprioreceptors of the stomatological system. This can cause bruxism (clenching or grinding), which leads to a functional impact of the cranio-mandibular system. These parafunctions can have a destructive influence caused by higher loads of force to teeth, periodontia, muscles and mandible joints. Patients with new fillings, crowns and bridges or after orthodontic treatment, who complain of typical symptoms (CMD-Syndrome), should undergo a specific examination of their occlusion. Premature contacts are often uncomfortable, as the proprioreceptors react sensible under pressure. The patient will try to compensate to the occlusal interference by adapting to a new habitual position, with consequences for the attached tissue structures.

It is important not only to detect, but also to avoid further functional disorder in the cranio-mandibular system. Smallest interferences in a habitual occlusal position (HICP) can cause serious functional disturbances. Acute functional disorders like clenching or grinding can have a destructive influence and become chronic.
Neuromuscular Bite-Registration

Insert an Aqualizer into the patient’s mouth. Based on clinical experiences the Aqualizer should be used for a period of 1-2 weeks to achieve a sufficient relaxation and relief of the involved tissue structures. The mandibular of the patient is stabilized in a comfortable neuromuscular (physiological) position. Using an Aqualizer for a shorter period is also possible to start an immediate bite registration. A short-term use of Aqualizer is only indicated by less tensed patients. A previous treatment by a physiotherapist is highly recommended for extremely tensed patients.

1. use the Aqualizer at least for 60 Minutes or longer
2. acrylic fillings have to be isolated with nutritional oil or medical Vaseline
3. instruct the patient to bite down naturally with the Aqualizer still in place, while injecting registration material
4. across the anterior teeth from cuspid to cuspid - wait until the registration material is completely cured
5. remove the Aqualizer with anterior bite registration still in place
6. inject registration material to the posterior teeth
7. distribute the registration material equally between the molar teeth
8. wait until the registration material is completely cured and check the registration
9. bite registration in physiologic position
10. remove the bite registration
11. divide the bite registration into three parts to avoid material tension for better remounting on the stone model

For this registration technique a bite registration material with a high final hardness is recommended like materials which are formulated with bisacrylate. The German Company DMG manufactures a material called DMG Luxabite which fulfills the requirements for this technique.

After the bite registration is finished, this registration is used for setting the articulator in a physiological condylar position. For this technique a fully adjustable articulator like SAM 3 or ARTEX is highly recommended. For a quick check up of the bite registration, the Galetti articulator has proven handy in daily practice, for a quick diagnosis of the physiologic position. After remounting the bite registration in the fully adjustable articulator, a hard rigid splint in this physiologic position will be customized. The patient should wear this customized splint during therapy until the significant symptoms have improved.

The advantage of this method is transferring the neuromuscular or physiologic position of the mandible to the custom made occlusal splint. The Aqualizer is not a permanent splint and should not replace a custom made functional splint. Hard rigid occlusal splints are indicated for the long term treatment of CMD patients. Hard splints can subsequently be adjusted to build a stable physiological position of the condyles. If the patient is complaining about his splint or feels uncomfortable with his splint, an Aqualizer low volume can also be used in combination with custom made splints. After a neuromuscular deprogramming, the occlusion on the custom made splint should be checked. Interfering high spots can be equilibrated. This technique has been established by the dentist Christian Katzcher from Hamburg – Germany and successfully implemented on many patients.

Occlusal splint in physiological Position of condyles

For this registration technique a bite registration material with a high final hardness is recommended like materials which are formulated with bisacrylate. The German Company DMG manufactures a material called DMG Luxabite which fulfills the requirements for this technique.
Neuromuscular Bite Registration

12. neuromuscular bite registration
13. trimming bite registration – removing undercuts
14. check the bite registration in the patients mouth
15. remounting of the bite registration in a Galetti-Articulator

16. bite registration in a Galetti-Articulator
17. neuromuscular Position
18. clearly visible occlusal impressions on the palatinal surfaces
19. transferring of the relevant parameters into a CAD/ CAM Software

Customization of an occlusal splint in physiological position of the condyles

There are plenty of techniques for customizing a splint. Usually a dental technician will accomplish this part. A modern variation is customizing splints with CAD/CAM Software like Cera Mill from the company Amann Girrbach. The relevant information of the neuromuscular bite registration is transferred into the virtual articulator. Also the combination with electronic Jaw Tracking Systems like JMA (Jaw Motion Analyser) from the company Zebris are possible. The relevant information of a Jaw Tracking System can be also used in modern CAD/CAM systems. After having designed the splint in the software, the customized splint is milled out from one piece of a PMMA acrylic blank. This new customized splint should stabilize the condyles of the patient in a physiologic position.
The expression CMD (cranio mandibular dysfunction), which is also known as temporomandibular disorders or temporo-mandibular-Joint-Disease (TMDs, TMJ), describes a complex dysfunctional correlation of the individual structures of the stomatognathic system. The CMD Syndrom is a result of the summation of physiological stress depended on the load frequency, duration and intensity and the minor adaption ability of the stomatognathic system. The common symptoms could result from different areas of the body. The etological factors of CMD could superimpose. This makes a sufficient diagnosis very complex. Patients are often complaining about different symptoms like headache, joint problems, pain of neck and shoulders, difficulties with chewing and swallowing, earache, etc.

**Head:**
headache or similar symptoms like migraine, pain of the temporo mandibular joints, pain of the masticatory muscles (pain on palpation), neuralgia, facial pain, clicking of joints, limited ability to open the mouth

**Teeth:**
clenching and grinding, grinding and abrasion facets, dental cervical lesion, dentin fractures, chipping of ceramic restorations, wear and tear on fillings

**Tongue / Cheek:**
bite impression, scarring

**Ears:**
earache, tinnitus, dizziness, sensitivity to loud noises, reduced hearing ability

**Eyes:**
sensitivity to light, diplopia (double vision), fatigue of the eye, reduced eyesight

**Back:**
painful muscle tenseness and cramps, hardening of the muscles (myogeloses) and painful trigger points

**Shoulder:**
painful muscle tenseness and cramps, hardening of the muscles (myogeloses) and painful trigger points

**Neck:**
painful muscle tenseness and cramps, hardening of the muscles (myogeloses) and painful trigger points

**Simple differential diagnosis with typical CMD symptoms**
This catalogue of questions, that include consideration, can be helpful for the anamnesis of the patient. Each patient should be questioned carefully during the anamnesis to above-mentioned symptoms. If three or more symptoms apply, you can assume generally that the patient suffers from a CMD syndrome.