Sensorimotor training with RehaBite during orthodontic treatment

Author: Dr Daniel Hellmann, Germany

In daily practice, temporomandibular disorders (TMD) are usually treated with splints, such as Michigan splints, or similar devices. However, orthodontists have the problem that occlusal splints cannot be used in patients who are growing, or in patients undergoing therapy. In this context, sensorimotor training is an effective therapy for pain relief. Relieving postures caused by TMD pain can be eliminated without any influence on the occlusion of the patient. Additionally, neuromuscular adaptation will be supported actively using the RehaBite sensorimotor training appliance during orthodontic treatment.

Motor adaptation and rehabilitation

Healthy motion sequences can transform to relieving posture patterns due to musculoskeletal pain, changing the intra- and intermuscular recruitment patterns. This can cause stiffening of muscles, in conjunction with a reduced range of movement patterns. The stiffening process is a natural response that provides temporary relief by splinting the painful areas. Longer periods of pain can lead to lasting restriction of the physiological range of movement. In the long term, such relieving postures can trigger unphysiological stress of the tissue involved. Modern therapeutic concepts use active rehabilitation measures to improve motion patterns. Such actions can help to relieve painful adaptations triggered by coactivation patterns of the muscle structures involved.1–4

Coordinative sensorimotor training with RehaBite

Numerous studies have stated that home exercises can have an equally therapeutic effect like regular occlusal splints (Michigan splints or similar).5–7 Sensorimotor training with the RehaBite device improves the neuromuscular adaptation by controlling the movement and positioning of the mandible. Increased strain of sensory feedback systems and the stimulation of central nervous integration processes are triggered by sensorimotor training. The coordinative training leads to long-lasting changes of the intra- and intermuscular recruitment pattern. In conjunction with the training effect, it is assumed that coordinative training also causes structural modifications in specific cortical regions.6, 9 In patients with muscle pain, the coordinative training can cause a hypalgesic effect, that is a significant reduction of sensitivity to pain (exercise-induced hypalgesia).10

Practice of coordinative training with RehaBite

RehaBite is a training device for home treatment and rehabilitation of muscle pain of the masticatory system. The elastic, fluid-filled bite pads work in accordance with the hydrostatic principle. In other words, the mandible can auto-balance itself11 on the fluid-filled bite pads like a see-saw (Fig. 1). The automatic, built-in feedback of the device provides the patient the ability to control the intensity of her training, and makes it possible...
for the patient to accurately and faithfully reproduce training conditions (Figs. 2 & 3). Biofeedback in combination with active training can intensify motor learning processes.12 Spontaneous modifications of the intra- and intermuscular patterns of contractions of the muscles involved and physiological activation are frequent effects.

In the case of painful muscular jaw opening restrictions, the training is supplemented by intensive stretching exercises (Fig. 4). By using the post-isometric relaxation that is the result of the coordinative bite, the stretching effect is increased further still. The training exercises can either be performed under the instruction of the treating doctor or physician, or the patient may also use the RehaBite device for individual training, regardless of time or place, and can be further supplemented by exercises like gentle muscle massages.

Coordinative training for relieving TMD symptoms is very effective, and in some cases, necessary for patients undergoing orthodontic treatment. Home exercises like gentle massage and training tools such as RehaBite have shown significant results by improving muscle coordination and resolving relieving postures.

Editorial note: A list of references is available from the publisher.

**Dr Daniel Hellmann**

is senior physician of the Department of Prosthodontics, University Hospital Würzburg, Germany.

Pleicherwall 2
97070 Würzburg
Germany

hellmann_d@ukw.de

---

**Fig. 1**

The mandible can auto-balance on the hydrostatic device like on a see-saw.

**Fig. 2**

How the RehaBite works.

Biting on the elastic bite fork applies an impact of force to the liquid in the closed hydrostatic system. This force is transmitted to a mobile piston connected to a mechanical spring. The piston moves up and down in front of the handle. The tip of the piston can be felt with the fingertip at the front of the handle. The RehaBite allows five levels of intensity, which can be adjusted with the integrated force control screw at the front of the handle.

**Fig. 3**

Bite training with finger feedback.

**Fig. 4**

Finger and thump grip for stretching muscles to treat functional restricted mouth opening.

---