OCCLUSION
Principles & Treatment

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For many years, it was thought that a single tooth could be the cause of or the solution to all masticatory problems. Such overestimation of the complexity of occlusion created many distortions in treatment planning; in particular, it kept many clinicians from applying occlusal principles to the treatment of temporomandibular disorders. On the other hand, oversimplification of this branch of dental science and its relegation to a secondary role are equally grave mistakes.

All facets of dental treatment require a multidisciplinary approach. According to chaos theory, to understand the fractal dimension of a biological event, the observer must give substantial attention to every factor. This applies to the behavior of the masticatory system in the sense that every single element of the masticatory apparatus has a role in the occlusal process, as well as in other activities of the craniofacial complex, regardless of the perspective of the observer.

The masticatory apparatus is unique in the human body. The mandible is a very mobile bone within which the dominating functional elements reside: the teeth, alveolar processes, condyles, and attached muscles. It relates to the maxilla, a fixed structure, via teeth in the opposing arches, which contact during mastication. Muscles and a complex neurovascular network are integral to the efficient functioning of the mandible not only in mastication, but also in the proprioceptive control of spatial positions of the jaws, breathing, speech, and swallowing. Consequently, synchronism among the elements of this system during action is critical; what occurs on one side of the mouth must be compensated for on the other side. Therefore, an attentive clinician must keep the interocclusal relationship of a patient under constant observation during treatment of the masticatory system.

Literature on the subject of occlusion is extensive, varied, and confusing, giving rise to a great deal of controversy. Many theories have been advanced to explain and guide professionals in the use of techniques and clinical approaches, seeking varied objectives. Some theories are now outmoded because of their limited goals and dated observations, while others have produced rational methods of treatment. Nonetheless, their application requires a balanced and accurate understanding of the science
It is often challenging for the clinician to diagnose and treat a patient who has occlusal problems, temporomandibular disorders, and/or facial pain. The clinician must employ a sound clinical protocol for evaluating and managing patients with these conditions. A logical, effective protocol is described in this chapter.

**PATIENT INTERVIEW**

The first consultation, or interview, between the clinician and the patient often suggests that something formal is going to occur. However, this is not necessarily true. During the first interview with the patient, the clinician assesses the patient’s feelings, fears, and expectations about the dental problem and asks why the patient believes that treatment is necessary. A patient’s problems may range from simple conditions to a complex variety of signs, symptoms, and emotions. Sometimes, deeper, pertinent questioning will reveal the cause of the patient’s problem or at least an indirect link with it. In addition, other interdisciplinary consultations might be useful to modify not only the course of the therapy but also the outcome and prognosis of the prescribed treatment.

During the initial interview, it is helpful to let the patient present the analysis of his or her problem. This may reveal the chronicity of possible problems and corresponding signs and symptoms as well as provide a progressive overview of features that may identify the stages of the disease or dysfunctional process. The well-conducted interview will very likely reveal the patient’s attitude toward the condition and treatment. This aids the clinician’s rational expectation of how much success may be achieved in solving the patient’s clinical problem.
Reading the occlusal imprints

After the material has set, the articulator is opened to disclude the teeth and permit a reading of the indentations on the resin. Figure 7-29 shows impressions produced by the maxillary right first molar on the soft material that was used to replace the occlusal surface of the opposing mandibular right first molar.

The restoration is now cured, according to the manufacturer’s recommendation, with a light wand or another appropriate source of visible light.

The patient’s and clinician’s eyes must be protected with filters.
Carving the occlusal restoration

If indentations are well produced, the carving of the occlusal surface with rotary instruments is not supposed to be a very complicated task. Based on geometric principles used for single-unit carving, the following steps are performed for carving of restorations on articulated casts.

First, the excess resin that remains on the buccal and/or lingual sides of the crown is removed. It is necessary to proceed carefully to avoid overreduction. At this stage, buccal and lingual developmental lobes and grooves are created, according to the guidance provided by the height of contour of adjacent teeth and opposing crowns (Figs 7-30 and 7-31). It is important to define the size of embrasures by carving out the excess material at the level of the line angles (see Fig 7-11).

Next, the position of the marginal ridges is adjusted. Any overhang of material must be eliminated, but care must be taken to avoid damaging the occlusal surface. Occlusal cusp inclines are now defined with small, rotary-mounted points in accordance with the geometric pattern for the crown being carved. The geometric orientation of these inclines must be clearly defined as the sides of the pyramids. These inclines are limited by the mesiodistal and buccolingual grooves of the occlusal surface. The carving process may be carried out with high-speed burs.

Once the occlusal surface has been defined, all sharp edges are rounded. Rotary instruments are used again to work directly on ridges and cusp tips. Secondary anatomy, secondary grooves, or other anatomic details of the occlusal surface are added at this time. Secondary grooves are shallow depressions on the surface of each incline and are limited by the triangular ridges of each cusp. All occlusal details should present a continuity of the features shown by adjacent teeth. For example, the alignment of mesial and lingual cusp tips, as well as