3.5 Models

The examination is continued by examining models of the patients' teeth which should be mounted in a semiadjustable articulator after face-bow transfer. Crowding, both absolute and relative, and transverse discrepancies are noted. A relative transverse discrepancy is present when the models are moved in a model operation and the apparent cross bite is resolved. The casts should be examined for steps in the plane of the occlusion. This is done by placing the occlusal surfaces of the models on a flat surface. If all the teeth do not touch the flat surface, there is a step in occlusion. The mounted casts serve as a basis for model operations and the fabrication of intraoperative splints or wafers (**Figs 7.1-4**, **7.1-5**).

4 Classification

4.1 Mandibular excess

Horizontal excess in the mandible is usually called mandibular prognathism or hyperplasia. It is frequently a combination of an anomaly of the dental arch, mandibular excess, and macrogenia. However, the patient can have dentoalveolar horizontal excess and genial deficiency. Additionally, there may be a vertical component of alveolar mandibular hyperplasia. The combination of discrepancies will determine the ultimate treatment plan. Clinically the patient will present with a strong lower jaw, a long chin-throat angle, and will usually have difficulty with some aspects of speech and incising food.

4.2 Mandibular deficiency

Horizontal deficiency in the mandible is often called mandibular retrognathism or hypoplasia. It is frequently a combination of an anomaly of the dental arch, microgenia, and mandibular alveolar hypoplasia. As with mandibular excess, each component must be examined as part of the treatment plan. Clinically the patient will present with a soft or weak chin with a poor chin-throat angle or a "double chin." Frequently these patients habitually posture their jaws in order to function better. Sometimes it is difficult to determine

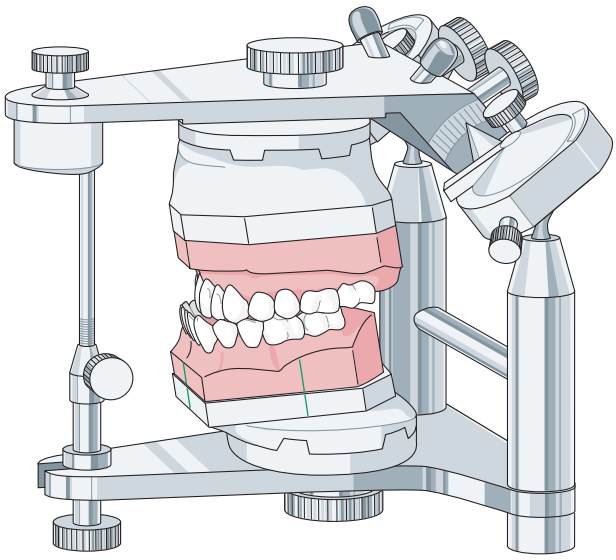

Fig 7.1-4 Mounted casts of a patient with mandibular prognathism in the preoperative class III situation.

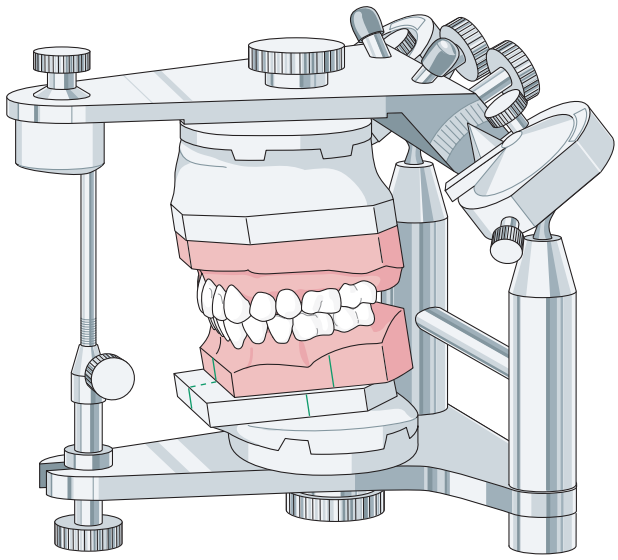

Fig 7.1-5 Backward movement of the mandible cast in the articulator into the desired class I situation.

where the correct position of the mandible is, due to their habit. Sleep apnea may be an issue, especially in patients who are very deficient or have combined maxillary deficiency states and obesity.

4.3 Mandibular asymmetry

Mandibular asymmetry may be seen in isolation or in combination with either excess or deficiency states of the mandible. Depending on how much the mandible is shifted to one side, the soft tissue of the lips may be distorted. This can make assessment of dental and facial midlines difficult. A simple tool to assess dental midlines in a patient with severe asymmetry is to have them align their dental midlines. This will usually correct any soft-tissue distortion.

4.4 Vertical discrepancies of the mandible

Vertical discrepancies with asymmetry of the mandible are usually due to deficiency or excess discrepancies of the condyle(s) or ramus. The etiology should be assessed as to whether it is an active process or a burned-out process. If there is an overgrowth as in condylar hyperplasia the chin point will be canted away from the site of increased growth. Depending on how active the condyle is growing, there may or may not be a posterior open bite on the same side. In addition, the mandibular midline will usually be shifted to the opposite side with a dental class III malocclusion. In contrast, a patient with progressive condylar resorption may have the chin canted to the side of the deficiency, a class II malocclusion, and with the midline shifted to the side of the deficiency. Patients with asymmetric deficiency states frequently posture their jaws forward in order to function better. It is recommended to carefully examine these patients in order to document and accurately record occlusal shifts. It is important in both active growth and deficiency states to determine whether and how active the process is. This can be done by radionucleotide imaging. Clinically, patients may be followed by serial cephalometric examinations, with x-rays in centric relationship. An active growth process can be diagnosed with radionucleotide imaging. When active growth or resorption is occurring, surgery may need to be delayed or modified to address the active state. Passive or inactive processes such as old condylar fractures or hemifacial microsomia can be treated without these measures if it has been determined that normal growth is completed and there are no functional issues that need to be addressed before surgery.

4.5 Maxillary hyperplasia

Maxillary hyperplasia has three component subsets that must be assessed. These are vertical, horizontal, and transverse. The patient may have anterior and/or posterior vertical maxillary excess. Clinically, in addition to a long middle third of the face, if the patient has anterior vertical maxillary excess, they will show more than 2–5 mm of their central incisors at rest. Excessive tooth show at rest is only a sign of vertical excess if the upper lip length is normal. In both vertical and horizontal maxillary excess the patient may show excess amounts of central incisors with animation. In the horizontal maxillary excess tooth show at rest will be normal. In anterior vertical maxillary excess there will be excessive tooth show at rest. If a patient has posterior maxillary hyperplasia without anterior maxillary hyperplasia, tooth show at rest will be normal but the patient will have a long lower face height with an open bite.

4.6 Apertognathia (open bite)

Apertognathia or open bite has several different causes. The most frequent is posterior maxillary excess often associated with a transverse discrepancy of the maxilla. However, it may also occur in patients with macroglossia and in those patients with short posterior facial heights. All patients with anterior open bite usually have lip strain in an attempt to achieve closure of the lips. Patients with macroglossia tend to have the tongue frequently between the teeth. In these cases the patients usually have a component of the open bite in both the upper and lower jaws. In the lower jaw, there will be a reverse curve of Spee, frequently with flaring and splaying of the lower incisors. Patients with short posterior facial height usually have a steep mandibular plane and crowding of dentition.

4.7 Maxillary hypoplasia

Maxillary hypoplasia also has three component subsets of vertical, horizontal, and transverse. Patients with horizontal and vertical deficiency will have deep nasolabial folds in the frontal view and an obtuse nasolabial angle in profile. Clinically, it is common to find both horizontal and vertical deficiency together, especially in patients with a history of cleft lip and palate. Occlusally, they will have a class III dental relationship. Absolute transverse discrepancies will be present in some patients; they are often seen in patients with cleft lip and palate.

For more detailed classifications see **Table 7.1-1**.