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## Technical note

# Modified wafer for orthognathic surgery in partially edentulous patients

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**Keywords:** Orthognathic surgery; Wafer; Ostotomy; Partially edentulous; Older patient

We present a modified wafer for mandibular orthognathic surgery in a partially edentulous 49-year-old woman. To the best of our knowledge, this technique has not been reported previously, and it was effective with an operating time that was comparable to similar operations in dentate patients.

The patient was referred to us with functional problems with eating as a result of retrusion of the mandible. There was no evidence of condylar resorption and the jaw was deemed stable postoperatively, but she desired correction of the increased overjet and overbite that had caused functional problems for most of her life (even before she had become partially edentulous). The difficulty in predicting the position of mandible and ensuring stability of the postoperative occlusion was caused by the loss of the lower left molars.

In our unit, we would usually use a lower partial denture fixed to the mandible using circummandibular wires, and then fix the maxillary partial denture to the maxilla. We would use a traditional wafer to achieve intraoperative occlusion. The new technique used a mandibular plate and a maxillary plate without denture teeth. These were tried intraorally before operation and a wafer bonded the plates as a single unit, locking the mandible in the planned occlusion (Figs. 1 and 2). Intermaxillary fixation (IMF) screws were used to hold the mandible in occlusion during operation (Fig. 3).

Using 3-dimensional CAD-CAM technology offers several advantages for orthognathic planning for patients who



Fig. 1. Two dentures on the articulator.

are fully dentate. In patients who are partially edentulous, however, the issues with tooth-borne and tissue-borne appliances are complicated by differential movement of the mucosa and teeth on the seating appliances, particularly when there has been periodontal disease. It was therefore desirable to use a standard dental impression technique that simulated movement of the mucocompression and periodontal tissues. Whilst this can be overcome by scanning the impressions or dental casts for 3-dimensional model surgery, visualisation of the angle between the proximal and distal segment in the parasagittal plane using 3-dimensional simulation has yet to be perfected. The resultant maxillary and mandibular 3-dimensional printed wafers also need to be tried-in for fit separately, before being united for operation.

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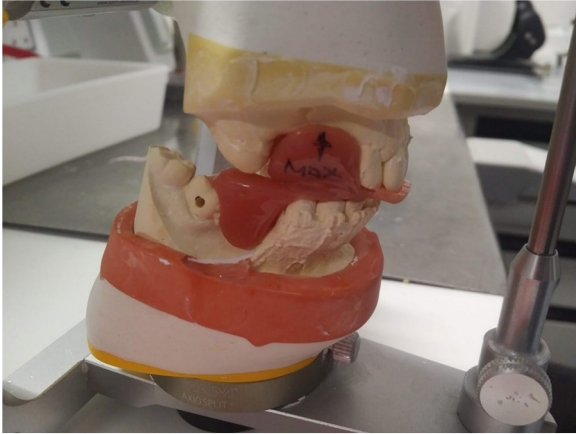


Fig. 2. The two dentures merged to form a modified wafer.

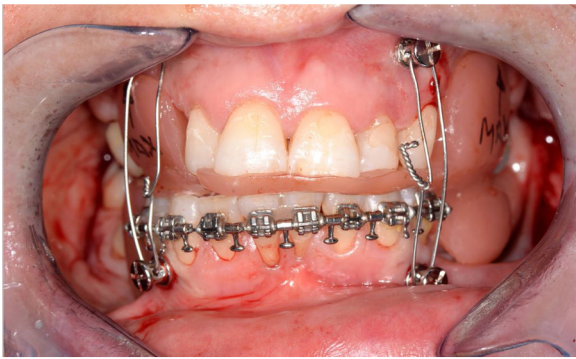


Fig. 3. Intraoperative occlusion using the modified wafer.

The disadvantages of 3-dimensional planning for partially-edentulous patients have yet to be resolved, therefore.

These factors were explained to the patient and she agreed to using the modified wafer. A bilateral sagittal split osteotomy was performed, and the mandibular segments were fixed using plates and screws. The occlusion was deemed stable on removal of the wafer with only the anterior teeth in contact. She was discharged from hospital the day after operation. On review within the orthognathic surgery clinic, the occlusion was found to have remained stable and she reported no sensory deficit.

This is an unusual case in an orthognathic surgical patient who was older than we are used to treating. Using this modified wafer allowed the operation to be completed in a timely fashion, in what has proven to be a useful and effective technique.

#### **Conflict of interest**

We have no conflicts of interest.

#### **Ethics statement/confirmation of patient's permission**

Ethics approval was not needed. No identifying information has been included.