

# Hypothetical Model of Clinical Remount Benefits Existing Dentures

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The clinical remount procedure, which involves remounting the dentures on an articulator with interocclusal records, can effectively reduce occlusal discrepancies. This procedure can be applied not only to new dentures but also to those already in service. Performing a clinical remount on these existing dentures would enhance the oral function of the denture wearer and would enable effective and accurate correction of the accumulated errors in the jaw relationship in a stable working environment. The clinical remount procedure should be performed if a patient has poor masticatory function or occlusion-related complaints. This procedure remains an essential skill both for fabricating quality dentures and maintaining those already in service.

clinical remount

complete denture

malocclusion

## 1. Introduction

Occlusal harmony and an accurate, reproducible jaw relationship are necessary for complete dentures to function efficiently <sup>[1]</sup> (p. 394) <sup>[2]</sup>. Occlusal harmony can be achieved using various intraoral and extraoral methods.

The occlusion of dentures can be corrected in patients' mouths directly using articulating paper, occlusion wax or central-bearing devices <sup>[1]</sup> (p. 395). The intraoral method is intuitive and convenient, and procedures can be interrupted and continued according to the appointment time. However, it is clear that the results of the adjustment may be jeopardized by displacement of the denture supporting tissues, interference of saliva, inconsistent markings and confined vision <sup>[3][4][5][6][7]</sup>.

The extraoral method, or adjusting the occlusion of complete dentures on an articulator, is often referred to as the remount procedure. The clinical remount procedure is to remount the dentures on an articulator with interocclusal records made in the patient's mouth <sup>[1]</sup> (p. 397). Establishing the occlusion and articulation of dentures outside the patient's mouth overcomes the flaws of the intraoral method. Although this procedure is considered complex and time consuming <sup>[6][8][9]</sup>, previous research has established that a clinical remount can efficiently remove occlusal interference, enhance comfort and masticatory performance and reduce the incidence of soreness and tissue irritation <sup>[6][10][11][12][13][14][15][16][17][18][19]</sup>.

Although previous expert opinions suggested that periodical clinical remounts should be implemented in the maintenance phase of complete denture treatment <sup>[20]</sup> (p. 113) <sup>[21]</sup> (p. 227), there is an absence of sufficient research and treatment guidelines <sup>[22]</sup>.

## 2. Hypothetical Model

The clinical remount procedure effectively and accurately corrects the accumulative errors of the jaw relationship.

### 2.1. Correction of the Accumulative Errors of Jaw Relationship

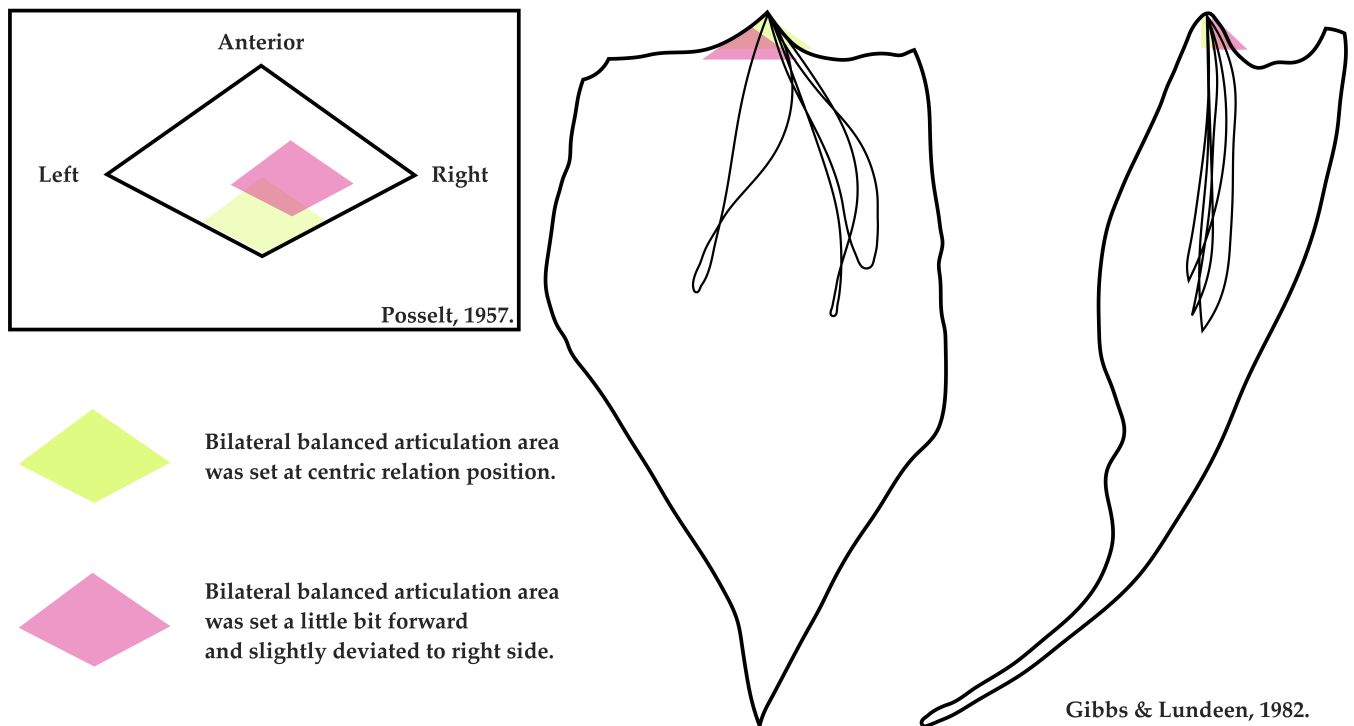
The first component of this model is "correcting the accumulative errors of the jaw relationship." Even when the prostheses were carefully balanced before delivery, many researchers have noted that discrepancies and malocclusion occur after the delivery of dentures. The reasons for the occlusal alterations can be classified into three categories: material factors, physiological changes and clinical practice.

For the material factors, the acrylic denture base is porous, and mild distortion will occur due to absorption of water [21] (p. 159). Additionally, it is not uncommon to find worn occlusal surfaces on those dentures that had already served for a while [6][23]. For the physiological changes, factors including settling of the dentures [21] (p. 159), neuromuscular adjustment [14], edentulous ridge resorption [23][24] and denture wearing habits [24] were reported in previous studies. Last but not least, occlusal alterations will also occur due to adjustments carried out by clinicians in recall appointments.

Long-term cephalometric evaluation also shows that complete dentures exhibit a counterclockwise rotation and forward movement mainly because of soft tissue seating [25] or efforts made by patients to retain poorly fitting, worn-out prostheses [26].

The clinical remount procedure should be understood as an extraoral method to establish occlusion and articulation of the prostheses at any designated position according to the bite registration; however, if the original jaw relationship is difficult to duplicate [6] or is unstable, it is safer to re-establish the articulation of the used prostheses as close to the centric relation (CR) as possible.

CR is widely considered to be the starting point of mandibular movement with reproducibility. From this position, the mandible can perform lateral and anterior eccentric movements [27][28]. Articulating the prostheses as close to the CR as possible maximizes the possibility that the mandibular movement coincides with the set articulation of the prostheses. This strategy also reduces the chance of horizontal deviation because the lateral movement border of the mandible converges gradually while retruding. Thus, the prostheses are more likely to be stabilized during the masticatory cycle (**Figure 1**) [29][30].



**Figure 1.** Diagram showing the advantage of setting the occlusion and articulation of dentures in the centric relation (CR). The original figures come from Posselt and Gibbs and Lundeen.

## 2.2. Selective Grinding on the Articulator

The second component of this model is “performing selective grinding on a stable platform.” Compared with the process of adjusting the occlusion in the patient’s mouth directly, the clinical remount procedure provides a solid, clean, saliva-free and easily accessible working environment. This procedure also reduces patient participation and alleviates psychological pressure [1] (p. 397).

Although the thickness of the articulating paper may vary from 25 to 100  $\mu\text{m}$ , the physiological displacement of the edentulous ridge has been reported to be larger than 500  $\mu\text{m}$  [3][4]. Research has indicated that compared with evaluating the occlusion of dentures on an articulator, marking the occlusal contact points with articulating paper in the patient’s mouth directly creates more spurious and false marks, regardless of whether the dentures have been stabilized [5][6]. Furthermore, it is difficult to check the occlusal status of each pair of molars individually intraorally. Mpungose et al. [7] established the low accuracy and poor reliability of evaluating the occlusal status by visual inspection only. The false, unclear marks lead to unnecessary grinding of the artificial teeth, decreasing the longevity of the dentures.

Additionally, edentulous patients today have different characteristics than those of earlier times, including greater mean age, more ridge resorption and increased loss of oral awareness and dexterity. These negative factors make an accurate and repeatable jaw relationship difficult to achieve. Last but not least, protracted treatment time and

intimate recalls may be unfavored for the edentulous patients nowadays because of greater age and impaired general health <sup>[31][32]</sup>.

Achieving the same extent of occlusal adjustment as the clinical remount procedure at the chairside directly would involve a challenging and lengthy appointment. From the patient's perspective, the use of the clinical remount procedure means that chairside procedures can be shortened, and the repeated procedure of inserting and retrieving dentures between each grinding can be avoided. The reduction in patient participation also grants the clinical remount procedure more versatility.

Some researchers have raised doubts about the necessity of the clinical remount procedure, particularly those focused on simplifying the fabrication of new complete dentures <sup>[32][33][34][35][36][37]</sup>. With carefully determined vertical and horizontal jaw relationships, newly fabricated complete dentures seem to serve patients well even without the clinical remount procedure. Nevertheless, as previously discussed, an accumulation of errors in the jaw relationship seems inevitable. Because of the unknown extent of errors in the jaw relationship of dentures already in use, the scholars believe that the clinical remount procedure should be undertaken to re-establish the occlusion and articulation if indicated.

Other researchers may doubt that an articulator can exactly duplicate mandibular movement. Discrepancies cannot be denied, and minor refinements may be needed even if the remounting procedure is carefully performed. However, as mentioned previously, the use of articulators reduces the number of chairside adjustments required <sup>[38]</sup>. Additionally, the scholars believe that the repeatable eccentric movements of an articulator and the solid working environment make it easier to establish a credible broad zone of bilateral balanced articulation <sup>[27]</sup>. As Heartwell and Rahn claimed, the remaining discrepancies are so negligible that the resilience of the supporting tissues accommodates for the error <sup>[1]</sup> (p. 399). The resilience of the supporting tissue in conventional complete denture treatment is a double-edged sword. Although the resilience of tissues hinders accurate adjustments from being carried out intraorally, this property also helps patients cope with the minor occlusal interferences of their dentures. One of the goals of clinical remounting is to minimize occlusal discrepancies and make those discrepancies minor enough for the supporting tissue to compensate.

## 3. Indications and Contraindications

### 3.1. Indications

The first indication is that the complaint is caused by occlusal discrepancies. Dentures with good retention but ones that become loose after conversation or chewing are likely to have faulty occlusion and articulation. Patients seldom complain precisely about the occlusion of their dentures, but they may complain about food being trapped between the ridge and the denture or uncertain sore spots without ulceration. As Heartwell and Rahn stated, one must assume that there are occlusal faults in all complete dentures until proven otherwise <sup>[1]</sup> (p. 394).



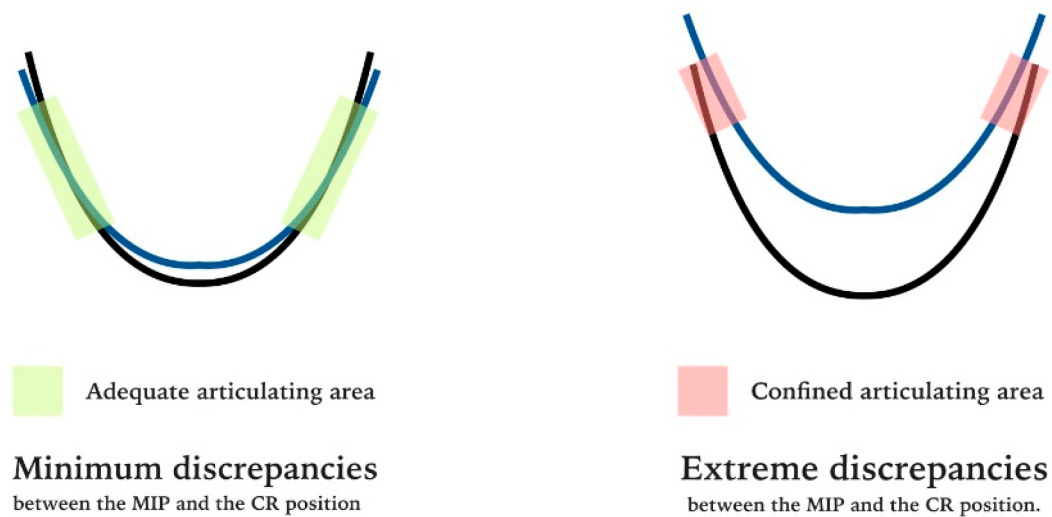
The second indication is poor masticatory function. Some patients have no complaints about their dentures because they have already given up chewing with their dentures. Patients may change their diet or swallow larger boluses of food to cope with decreased masticatory function [39][40][41]. Functional impairment may also not be recognized by patients. Masticatory function was previously evaluated with a reliable test food, such as carrots or peanuts, with the sieve method [37]. However, the complicated procedure of the sieve method is difficult to carry out in daily practice. Recently, a simplified but similar gummy testing kit has become commercially available in Japan and has been formally adopted as a diagnostic tool for oral hypofunction by the Japan Universal Health Insurance Coverage System (JUHICS) [42]. Verifying masticatory function with the gummy testing kit or other standardized foods, such as a certain brand of cookie, may help clinicians gather objective information about masticatory function. If a patient is diagnosed with poor masticatory function, performing the clinical remount procedure on the existing dentures may serve as a good starting point for the rehabilitation of oral function.

### 3.2. Contraindications

The treatment efficiency of the clinical remount procedure may be limited if either of two following clinical findings is noted: an extreme anterior–posterior discrepancy between the maximal intercuspal position (MIP) and the centric relation (CR) or an extremely low vertical dimension.

An extreme amount of anterior–posterior discrepancy between MIP and CR will hinder the treatment efficiency of the clinical remount procedure. If the occlusion of the denture is re-established in CR, as previously described, the overlapping area of the maxillary and mandibular arches will be heavily restricted owing to the anatomical shape of the human dental arches. Adequate posterior support may be difficult to acquire in such a confined area; thus, the adjusted dentures cannot be well stabilized

(Figure 2).



**Figure 2.** A case in which the clinical remount procedure is contraindicated on existing dentures. The extreme anterior–posterior discrepancy between the maximal intercuspatal position (MIP) and the centric relation (CR) had reduced the posterior occlusal supporting areas, making it more difficult to stabilize the adjusted dentures.

The second contraindication is extremely low occlusal vertical dimension. Removing occlusal discrepancies with selective grinding will decrease the vertical dimension slightly. If the existing dentures are already too thin to be ground, or the vertical dimension of the dentures is too low to achieve stable occlusal contacts intraorally, it may be more cost effective to make new dentures if there are no other special concerns (**Figure 3**).



**Figure 3.** Another case in which the clinical remount procedure is contraindicated on existing dentures. The vertical dimension of the dentures is extremely low, and the artificial teeth are heavily worn.

## 4. Conclusions

This hypothetical model portrays a possible mechanism for performing the clinical remount procedure on existing complete dentures. The accumulated errors of the jaw relationship can be corrected effectively and accurately in a stable working environment. The clinical remount procedure is suitable for correcting the occlusion of existing dentures and should be performed if a patient has poor masticatory function or occlusion-related complaints.

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