Modified Split-Cast Technique: A New, Timesaving Clinical Remount Technique

Fang-Chun Liu, DMD,[1] Kwing-Chi Luk, BDS,[1] Piin-Chau Suen, DDS, PhD,[2] Tzong-shiun Tsai, BDS,[1] & Yen-Chen Ku, DDS[1]

[1] Department of Dentistry, Chang Gung Memorial Hospital, Keelung City, Taiwan
[2] Graduate Institute of Basic Medical Sciences, Chang Gung University, Tao Yuan, Taiwan

Keywords
Clinical remount; remount.

Correspondence
Kwing-Chi Luk, 5F, No. 222, Maijin Road, Anle District, Keelung City 204, Taiwan.
E-mail: lukkchi@seed.net.tw

Accepted August 25, 2009

doi: 10.1111/j.1532-849X.2010.00624.x

Abstract

Interocclusal discrepancies can be eliminated by a clinical remount procedure, but most practitioners avoid it because of the time involved. This article introduces a new timesaving method, the modified split-cast technique. It uses a semi-adjustable articulator, tin foil as plaster separator, and an addition-type, silicone bite-registration material. The technician does most of the remounting procedures before the denture delivery appointment, so the dentist spends very little time chairside to complete the clinical remount procedure. Compared with the conventional and two other remounting techniques, the new technique is faster and easier to manipulate.

The comfort of a prosthesis in place is a commonly recognized prerequisite for positive adjustment to a newly fabricated complete denture. Occlusal discrepancy is reported to be one of many factors that may cause tissue irritation. This discrepancy may lead to an unstable denture, applying uneven pressure to both hard and soft tissues.[1-5] Occlusal discrepancy can result from warping of the record bases, incorrect centric relationship recording, or other faulty procedures in mounting and processing.[1-3,6-8]

Studies have shown that remounting procedures can improve denture stability, comfort, and chewing efficiency,[9-11] thus reducing patient recall appointments.[1,3,11,12] Remounting procedures are recommended to correct occlusal discrepancies at the time of denture insertion.[5-7,11,13] Intraoral occlusal adjustments may correct the occlusal error, but are less accurate.[3,10,14-16] As for the remounting method, laboratory remount procedures only eliminate the processing error;[1,7,17,18] however, a clinical remount allows adjustment of occlusal error as a result of incorrect centric relationship recording.[1,7,17,18] Although 91% of US dental school students are taught the clinical remount procedure at the time of denture delivery,[19] few practitioners use it,[19-25] with the excuse that it is time consuming.[2,3,11,13,17]

Hochstedler and Shannon used irreversible hydrocolloid material (alginate) to replace plaster as a remount cast fabrication material.[13] Ansari shortened the time of remounting procedures through preformed, custom-made mounting jigs (CMMJs) and used putty to construct remount casts.[2] Both these methods made the remounting procedure faster than conventional methods, but they still had drawbacks.

This article intends to introduce a new, timesaving remounting method called "modified split-cast remounting method," using a semi-adjustable articulator, tin foil as a plaster separator, and an addition-type, silicone bite-registration material. A technician does most of the remounting procedures before the denture delivery appointment, and the dentist spends very little time to complete the clinical remount chairside.

Technique

Before appointment

(1) Fabricate maxillary and mandibular remount casts.
(2) Mount the maxillary remount cast and maxillary denture with the preserved facebow record in the upper jaw member of the semi-adjustable articulator (Dentatus Articulator, Type ARH, Dentatus AB, Hagersten, Sweden).
(3) Fabricate mandibular secondary remount base. The incisal pin is set at −3 and locked. The articulator is inverted for convenience in mounting. Using maximal intercuspation of the maxillary and mandibular dentures, secure the mandibular denture along with its remount cast. Apply plaster separator (tin foil, tin foil substitute, or lubricating jelly) to the bottom of the mandibular remount cast (Fig 1). Mount the mandibular cast, along with its denture, on the lower jaw member of the articulator with dental plaster, forming a secondary remount base (Fig 2). Separate the mandibular remount cast from the secondary remount base, reset the incisal pin, and lock at zero. Thus, a space approximately 1- to 2-mm thick (Fig 3) is created between the mandibular remount cast and the secondary remount base.

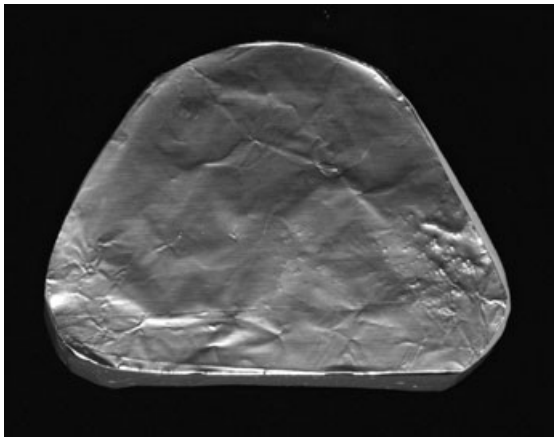

Figure 1 Apply tin foil over the bottom of the mandibular remount cast.

(4) Remove maxillary and mandibular dentures from the corresponding remount casts. Attach maxillary remount cast and mandibular secondary remount base cast to the upper and lower jaw members of the articulator, making ready for the clinical remount procedure.

Clinical remount procedure

(1) Cover the tissue side of each denture with pressure-indicating paste or disclosing agent and make appropriate corrections intraorally.
(2) Make a centric relation interocclusal record with an addition-type, silicone bite-registration material (Futar D, Kettenbach Dental Co, Eschenburg, Germany).

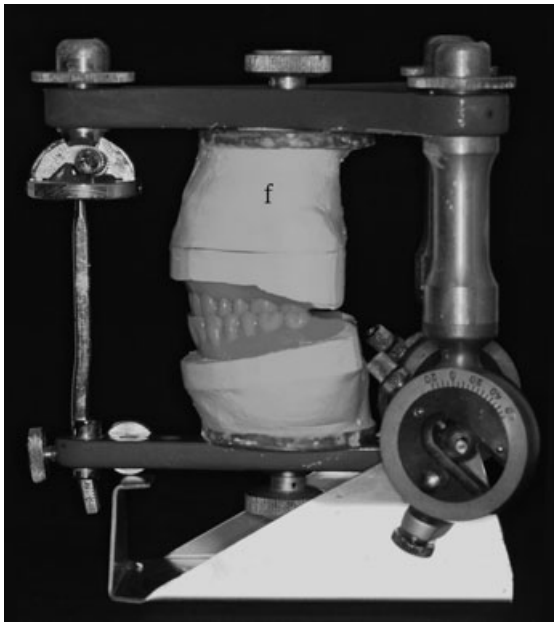

Figure 2 Mount the mandibular cast along with its denture on the lower jaw member of the articulator with dental plaster, and form a secondary remount base (f).

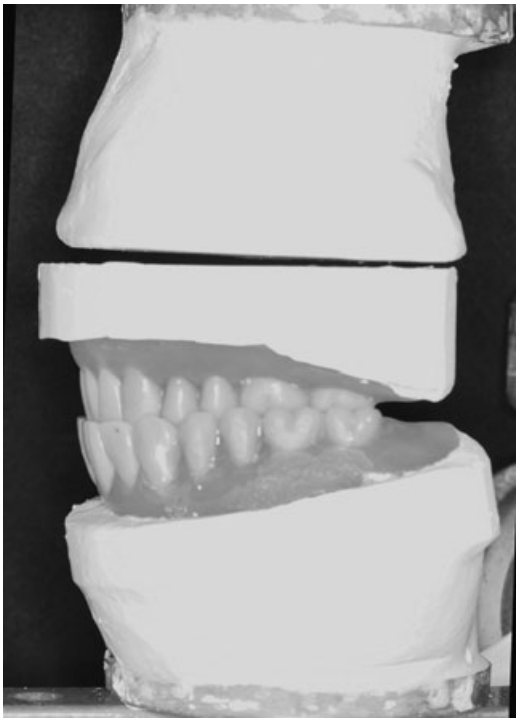

Figure 3 Reset the incisal pin, and lock at zero. A space with approximated 1 to 2 mm thickness is created between the mandibular remount cast and the secondary remount base.

(3) Secure the maxillary and mandibular dentures on their respective remount casts. Relate the mandibular cast to the maxillary cast according to the interocclusal record and lute them together with wooden rods and sticky wax (Fig 4).
(4) Adjust incisal pin height and inject the Futar D into the space created between the mandibular remount cast and the secondary mounting base (Fig 5), close the lower jaw member of articulator, and wait for Futar D to set (Fig 6). Because Futar D is fast setting (2-minute setting time) and has low elastic properties (initial Shore D hardness, 43),[26] it can be used as a remounting medium.
(5) Check the interocclusal relationship on the articulator, if necessary. Separate mandibular remount cast, then repeat steps 4 and 5 until a repeatable and stable centric relation position is obtained. After the accuracy of the articulator mountings is verified, occlusal errors can be corrected by selective grinding procedures.

Discussion

Conventional clinical remounting of dentures requires making the remount casts and mounting the upper denture by preserving the facebow record in advance. At the delivery appointment, the clinician uses fast-setting plaster[7,14,17] as a remounting medium to shorten the setting time. Past experience indicates that 20 minutes is often needed to complete a clinical remount procedure. Although 20 minutes is not a very long time, additional

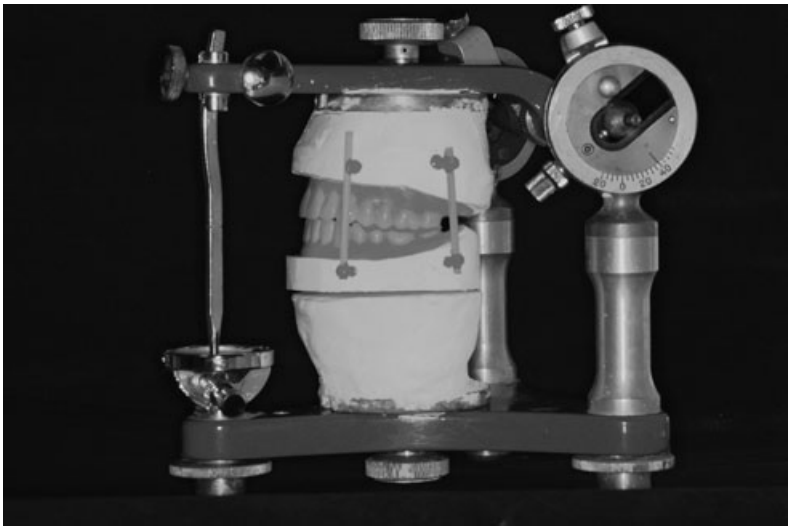

Figure 4 Relate the mandibular cast to the maxillary cast according to the interocclusal record, and lute them together with wooden rods and sticky wax. Adjust incisal pin height and create 1 to 2 mm space for remounting medium.

time may be needed to check and recheck the bite to establish a repeatable jaw relationship in a difficult situation.

Plaster as a remounting medium has certain disadvantages. Excessive water absorption by the plaster in the mounting stone and in the remount cast has always been a problem, affecting the fluidity of the plaster as a remounting medium. As a result, the clinician must trim excess mounting stone to create more space and soak it in water to prevent water absorption. Second, increasing space for the remounting medium may also worsen the dimensional change.[14,27,28] Third, the mixing and setting of the plaster adds to the time. Thus, the remounting procedure becomes more complicated and time consuming.

Hochstedler and Shannon used irreversible hydrocolloid material (alginate) to replace plaster as the remount cast fabrication material and succeeded in reducing the time for clinical remount procedures[13] because their technique eliminated the time needed to block out the undercuts in the denture or to construct the remount casts. It also eliminated the waiting period needed for the gypsum mounting medium to set;[17] however, its first disadvantage was that the casts and records cannot be saved to use at subsequent appointments for further adjustments. Second, occlusal adjustment on the articulator must not be delayed, because irreversible hydrocolloid changes dimensions over extended periods of time.[13] Third, the special articulator with a resin remounting plate is not indicated for checking the bite.

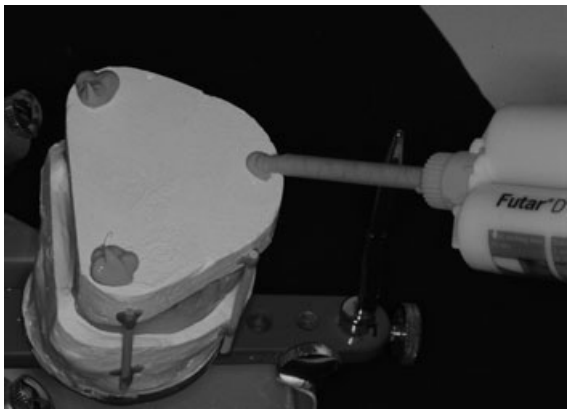

Figure 5 Inject addition type silicone bite registration material into space created between the mandibular remount cast and secondary mounting base.

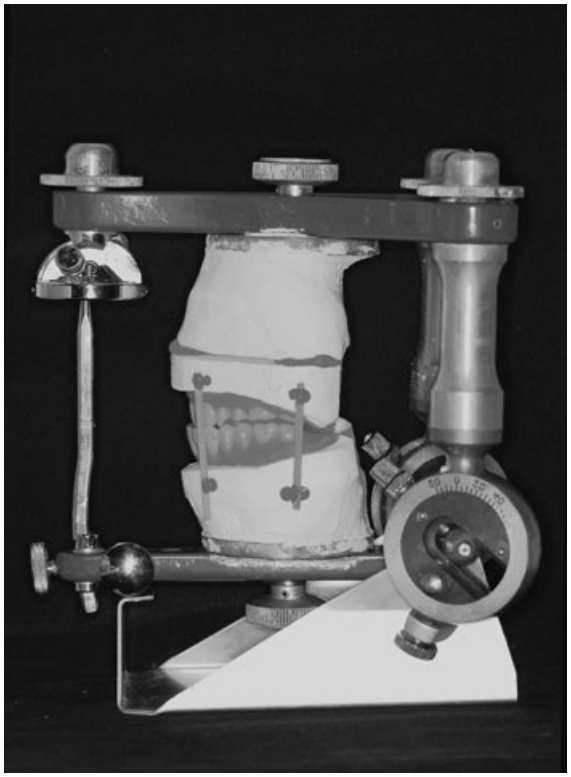

Figure 6 Close the lower member of articulator and wait for Futar D to set.

Table 1 Comparison of four remounting methods

Method	Modified split cast technique	Conventional remounting technique	Ansari[2]	Hochstedler and Shannon[13]
Prepare procedure in advance	√	√	–	–
Preformed remount cast	√	√	–	–
Preformed remounting base	√	√	√	–
Preserved facebow record	√	√	–	–
Special articulator	–	–	–	√
Checked bite	√	√	–	–
Remounting medium	Futar D	Plaster	Putty	Alginate
(1) Dimensional change	0.2%[26]	0.30%[28]	0.7%[29]	0.4 (± 0.2)%[29]
(2) Dimensional stability	Good[29]	Excellent[28]	Good[29]	Poor[29]
(3) Modulus of elasticity, rank	2[29]	1[28]	3[29]	4[29]
(4) Setting time of materials	2 min[26]	8 to 16 min[28]	9 to 11 min[29]	1.5 to 3 min (fast)[29] 3 to 4.5 min (normal)[29]
Estimated chair time for remounting procedure	3 min	20 min	15 min	5 min

Ansari shortened the remounting procedure with preformed CMMJs and used putty to construct the remount cast, saving both preclinical and clinical chair time.[2] This technique was more convenient and faster than the conventional method; however, in some cases the arch form of the CMMJs failed to match that of the dentures, causing insufficient retention between the CMMJ and the putty, increasing the height of the remounting base. Also, Ansari did not mention how to deal with the problem of checking the bite and repeating the mounting when an incorrect jaw relationship is found. In our opinion, remaking the putty-mounted cast for adjusting the jaw relationship is unreasonable and a waste of material.

In the new remounting method, a small space between the remount cast and the secondary remounting base is created, then filled with addition-type silicone material (Futar D) as the remounting medium. The setting time of auto-mixed Futar D is 2 minutes,[26] and the clinical remount procedure by the modified split-cast technique may take only 3 minutes. Thus, the remounting procedure becomes simple, fast, and clean, saving chair time for verifying centric relation and adjusting occlusal discrepancies. Chair time is shorter than that of the conventional remounting method; the amount (hence, cost) of the remounting medium is lower than the CMMJ method. Dimensional change of the remounting medium is minimal, while the modulus of elasticity is high.[26,29]

Comparison of four remounting methods is presented in Table 1. Our method is listed under the heading "Modified split cast technique."

Future studies of the dimensional stability of Futar D, as used in this method, should be made. The method may be used in cast-mounting cases such as surgical-orthodontic procedures and verifying centric relation in denture try-in appointments involving wax-ups of complete dentures, in which repeated mounting and bite checking is needed. Its advantage is faster separating and remounting of casts.

Acknowledgments

The authors thank International Science Editing for editing the article.

References

1. Shigli K, Angadi GS, Hegde P: The effect of remount procedures on patient comfort for complete denture treatment. J Prosthet Dent 2008;99:66-72
2. Ansari IH: Simplified clinical remount for complete dentures. J Prosthet Dent 1996;76:321-324
3. Ortman HR: Complete denture occlusion. Dent Clin North Am 1977;21:299-320
4. Hall WA Jr: Important factors in adequate denture occlusion. J Prosthet Dent 1958;8:764-775
5. Lytle RB: Complete denture construction based on a study of the deformation of the underlying soft tissues. J Prosthet Dent 1959;9:539-551
6. Badel T, Panduric J, Kraljevic S, et al: Checking the occlusal relationships of complete denture via a remount procedure. Int J Periodontics Restorative Dent 2007;27:181-192
7. Jacob RF, Zarb GA, Bolender CL: Waxing and processing the denture, their insertion, and follow-up. In Zarb GA, Bolender CL (eds): Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Prostheses (ed 12). St. Louis, Mosby, 2004, pp. 398-410
8. Woelfel JB: Processing complete dentures. Dent Clin North Am 1977;21:329-338
9. Firtell DN, Finzen FC, Holmes JB: The effect of clinical remount procedures on the comfort and success of complete dentures. J Prosthet Dent 1987;57:53-57
10. Sidhaye AB, Master SB: Efficacy of remount procedures using masticatory performance tests. J Prosthet Dent 1979;41:129-133
11. Al Quran FA: A clinical evaluation of the clinical remount procedure. J Contemp Dent Pract 2005;6:48-55
12. Holt JE: Research on remounting procedures. J Prosthet Dent 1977;38:338-341
13. Hochstedler JL, Shannon JL: A time-saving method for performing a clinical remount procedure with complete dentures. J Prosthet Dent 1995;74:39-41
14. McMillen LB, Rayson JH: Initial placement. In Ellinger CW, Rayson JH (eds): Synopsis of Complete Dentures. Philadelphia, Lea & Febiger, 1975, pp. 249-259
15. Friedman S: A comparative analysis of conflicting factors in the selection of the occlusal pattern for edentulous patients. J Prosthet Dent 1964;14:30-44
16. Sharry JJ: Complete Denture Prosthodontics (ed 3). New York, McGraw-Hill, 1974, pp. 276-283

17. Basker RM, Davenport JC: Prosthetic Treatment of the Edentulous Patient (ed 4). Oxford, Blackwell Munksgarrd, 2002, pp. 241-251
18. Heartwell CM, Rohn AO: Syllabus of Complete Dentures (ed 2). Philadelphia, Lea & Febiger, 1975, pp. 345-361
19. Petropoulos VC, Rashedi B: Complete denture education in U.S. dental schools. J Prosthodont 2005;14:191-197
20. Murphy WM, Bates JF, Huggett R: Complete denture construction in general dental practice: a survey. Br Dent J 1971;130:515-521
21. Fereday RC: Prosthetics in dental practice. Br Dent J 1970;129:385-391
22. Levin B, Sauer JL Jr: Results of a survey of complete denture procedures taught in American and Canadian dental schools. J Prosthet Dent 1969;22:171-177
23. Murphy WM, Bates JF, Stafford GD: Complete denture construction in dental schools and hospitals of the United Kingdom and Ireland: a survey. Br Dent J 1972;133:179-184
24. Harrison A: Prosthodontic techniques and the timing of complete denture procedure: a survey. J Prosthet Dent 1977;37:274-279
25. Harrison A, Huggett R, Murphy WM: Complete denture construction in general dental practice: an update of the 1970 survey. Br Dent J 1990;169:159-163
26. User information, Futar D, Eschenburg, Kettenbach GmbH & Co, 2008
27. Roraff AR, Stansbury BE: Errors caused by dimensional change in mounting material. J Prosthet Dent 1972;28:247-252
28. Anusavice KJ: Gypsum products. In Anusavice KJ (ed): Phillips' Science of Dental Materials (ed 11). Philadelphia, Saunders, 2003, pp. 255-281
29. Shen C: Impression material. In Anusavice KJ (ed): Phillips' Science of Dental Materials (ed 11). Philadelphia, Saunders, 2003, pp. 210-230