Diagnosing denture problems using pressure-indicating media

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Pressure-indicating media have more diverse applications than merely the identification of areas on the denture base that cause mucosal pressure and pain. The purpose of this article is to provide guidelines for optimal use of the media and to identify alternative uses that could be considered in daily practice. (J Prosthet Dent 2009;101:137-141)

Pressure-indicating media have long been advocated for use in diagnosing problems with dentures at insertion and denture adjustment appointments.[1-8] Typically, pressure indicators are used to identify problems related to impingement, extension, and/or width of prostheses.[8]

Although patient input is useful in identifying the general location of sore spots, patients often cannot precisely pinpoint the location of irritations.[9,10] Therefore, some authors[5,9] advocate that a denture base should never be modified without first using media to identify specific areas requiring adjustment.

While primarily used to locate areas on the denture base that cause pressure and pain,[8] pressure-indicating media have diverse applications for identification of a variety of denture-related problems.[5] Pressure-indicating media can be nonsetting and cream-based (Pressure Indicator Paste; Mizzy, Inc, Cherry Hill, NJ), nonsetting aerosol powders (Occlude; Pascal Intl, Inc, Bellevue, Wash), or media that polymerize (typically catalyst/base elastomers such as Fit Checker; GC Corp, Tokyo, Japan).

The purpose of this article is to provide guidelines for optimal use of the media, and to identify alternative applications for consideration in daily practice.

TECHNIQUE

1. Prior to applying media, remove any obvious spicules or sharp projections from the denture, to minimize patient discomfort.[9]

2. Evaluate the denture base adaptation with pressure-indicating media prior to occlusal adjustments, as alterations in the base adaptation can alter the occlusal contacts.[3]

3. Dry the denture before the application of media,[6,9] so that the material will adhere to the denture surface. However, leave the oral mucosa moist, so that the paste does not adhere to it. Instruct patients with a dry mouth to rinse with water and/or spray the paste-covered denture with water prior to placement intraorally.[1] Note that spraying the paste-covered denture with air-water aerosol is effective. After removal from the oral cavity, ensure that the media is not adhering to tissues and pulling off the base, creating a false positive for excessive pressure.

4. Use the correct amount of material. For cream types, apply sufficient material so that the base appears to be primarily the color of the media, as too little or too much material will make interpretation more difficult.[4,5] Use a stiff brush to place pronounced streaks in the material (Fig. 1).[1,3,6,11]

5. For polymerizing materials, use as thin a layer as possible to completely obscure the underlying denture. Do not place streaks in elastomeric materials. Place both types of media on the intaglio side of the prosthesis and over the flanges to evaluate for proper extension or frenal impingements (Fig. 2). Seat dentures with polymerization-type materials before the start of polymerization, so that the development of increased viscosity will not prevent complete seating of the denture.[2]

6. Insert the denture using mouth mirrors to retract the commissures, so that the material is not wiped away from the denture during insertion. If the entire prosthesis cannot be placed without touching the lips or cheeks, evaluate right and left quadrants separately,[8] and/or evaluate the denture base and denture peripheries separately.

7. When seating the prosthesis to verify tissue adaptation, use light pressure initially to ensure patient comfort.[6] Subsequently, apply firm pressure in the area of the first molars or instruct the patient to close with firm pressure on cotton rolls over the posterior teeth.[1,3,4,9,11] Do not allow occlusal contacts, which can cause tipping of the denture and a change in the distribution of pressure.[4,7,9,11]

8. If manual pressure is used, apply it as firmly as possible,[4] as increased pressure tends to increase the flow of indicator media.[7] Do not apply pres-

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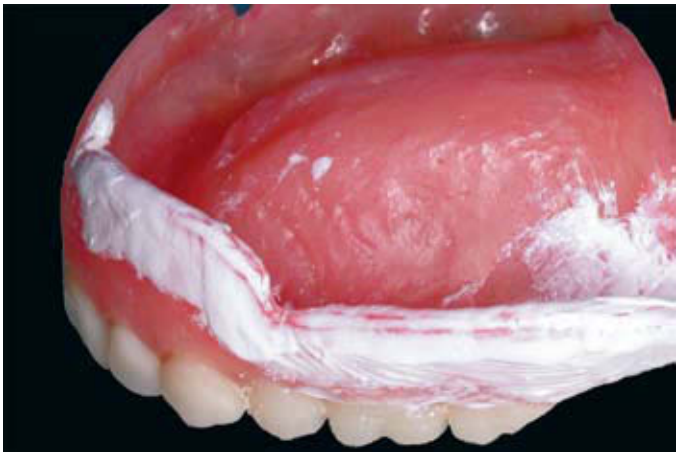
1 Coat denture with enough paste so base is primarily color of medium, with streaks in paste as on left. Too little (upper right) or too much (lower right) can make interpretation more difficult.



2 Apply paste well over flange edge onto buccal surface. Lines of burn-through on flanges often indicate overextended or overcontoured areas. Note double line of burn-through on facet where denture has already been adjusted.

sure on the palatal portion of a maxillary denture, as functional loading does not occur in this location.[3]

9. Exert pressure perpendicular to the occlusal plane unless evaluating the pressure pattern when the denture is moving.[9] Do not move or tip the denture or allow it to shift when assessing normal denture base fit.[5]

10. To evaluate flange extensions, stabilize the denture over the occlusal surfaces of the teeth to prevent it from moving while the patient makes functional movements,[12] or while the clinician manipulates the cheeks or lips,[8] to detect overextensions in areas of the moveable mucosa and frena, which typically do not displace media as easily as firmer tissues.

11. To interpret nonsetting pastes, examine the denture for 3 distinct patterns in the media: areas where streaks remain, representing areas where there has been no contact with tissues; areas with paste but no streaks, where there has been acceptable contact; and areas without paste, which normally suggest excessive pressure or impingement (Fig. 3).[3,5,6]

12. For polymerizing-type pastes, areas of excess pressure will appear as uncovered, or more lightly covered, with media (Fig. 4). Although nonpolymerizing pastes have been found to be more accurate in some situations,[2] use media of different thicknesses[7] or viscosities to identify problem areas that might not be identified by another media (Fig. 4).

13. Use caution when interpreting lack of paste surrounding tissue undercuts (Fig. 5).[9,11] Note that when the denture moves over an undercut, paste will normally be removed from the denture.[9,13] Adjust the undercut area only when there are signs or symptoms of excess pressure or tissue impingement. Similarly, expect slightly more pressure on primary bearing areas and do not adjust these areas unnecessarily.[1,11]

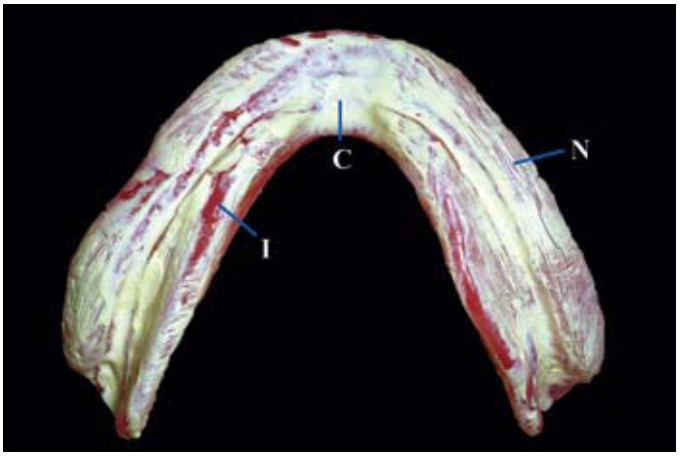
14. Note that commonly adjusted areas of complete dentures include the incisive papilla,[8] malar process of the zygoma,[9,13] median palatal raphe,[14] posterior palatal seal area,[9] hamular notch[8] (Fig. 6), pterygomandibular raphe, mylohyoid ridge,[8,9,12] border of the retromylohyoid space,[8] distobuccal border of the maxillary[9,13] and mandibular[8,9] dentures, bony prominences[8,14] or spicules, mental formina,[9] buccal shelves,[9] and frenal attachments.[8,9]

15. Use pressure-indicating media to detect and adjust other areas on the oral, rather than the intaglio, surface of a prosthesis. Note that functional impingements of the coronoid process against the distobuccal surface of the denture[8,9,14] (Fig. 7), bulky buccal contours[8] (Fig. 8), and teeth placed too far buccally into the vestibule (Fig. 8) can be identified using pressure-indicating media.[9]

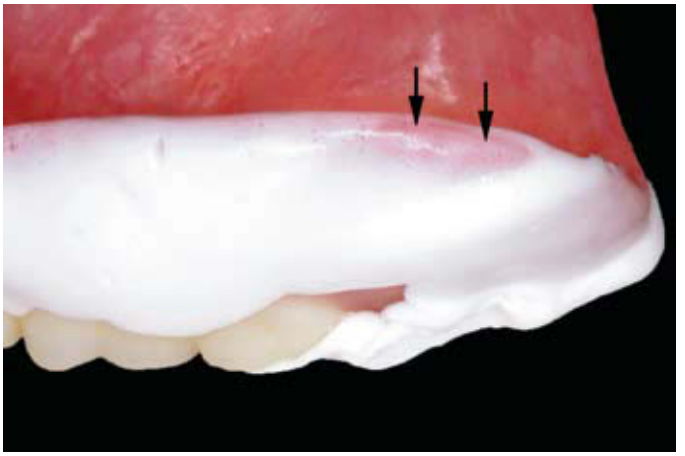
16. Diagnose speech problems, when possible, with palatograms, using paste and spray-type pressure-indicating media to diagnose tongue contact areas on the denture palate.[14,15] Instruct the patient to repeat problematic sounds with the media covering the palate. Note that different sounds result in different contact patterns[15,16] (Fig. 9), which can be modified by selective removal from or additions to the palatal contour. Note that the registration of the tongue contact area on the palate using paste-type media may sometimes require numerous repetitions of phonetic phrases before the registrations are easy to interpret.

17. After identifying areas requiring modification, adjust the denture with an acrylic bur of appropriate size and shape (H79E, H351E, H261E, H251E; Brasseler USA, Savannah, Ga). After adjustment, reapply media to ensure that the adjustment has been effective or to determine if other areas require modification.[8]

18. For cream-type media, use an air syringe to blow off as much of the adjustment debris as possible, then wipe away[6] any remaining debris in the cream, prior to reapplying paste with streaks.

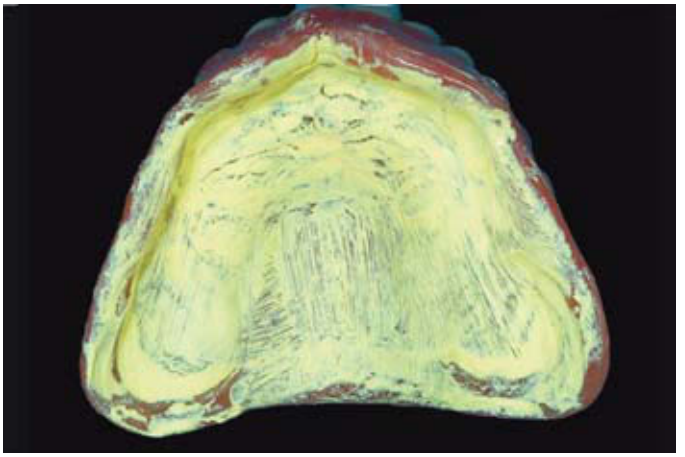


3 Areas with streaks remaining in paste have not contacted tissue (N). Areas of paste with no streaks represent acceptable contact (C). Areas without paste represent areas of tissue impingement (I).



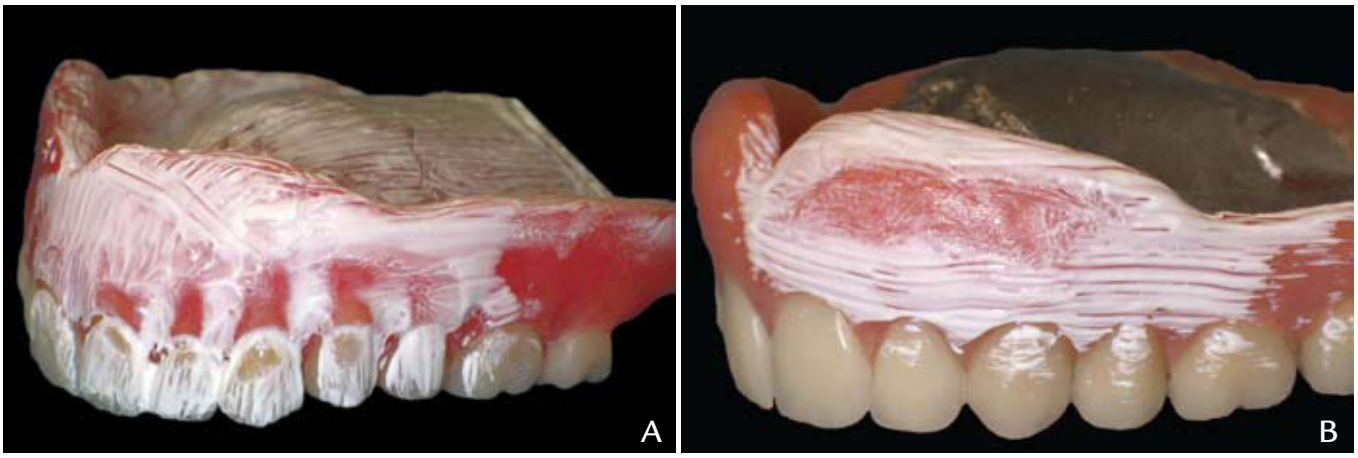
4 Slight flange overextension in retrozygomal area (arrows) caused displacement of denture during function. Cream-type media failed to reveal overextension.

5 Undercut areas will cause paste to be wiped off and will appear to need adjustment. Use caution in these areas.



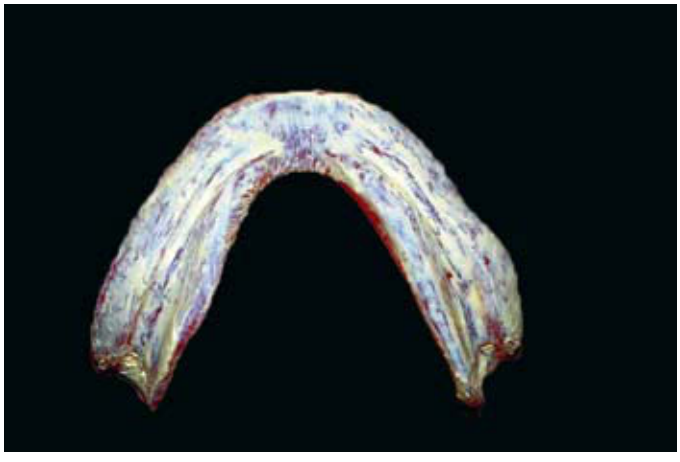
6 Use of indicating medium for adjustment of hamular notch areas is critical, as removal of acrylic resin in incorrect areas can result in breach of posterior palatal seal, resulting in decreased retention.

7 Use indicating medium on nonbearing surfaces of dentures to disclose problems such as impingement by coronoid process in lateral excursions. Interferences can cause both pain and loosening of dentures.



8 A, External contours of dentures can be evaluated with media. Bulky gingival contours around teeth have no paste. B, After functional movements, bulky flanges have no paste. Thin these areas, if patient has problems with loosening or discomfort.

9 A, Contour of palate can affect phonetics. Palatogram represents correct pattern for "S" sounds with minimal loss of pressure media behind central incisors. B, Palatogram represents correct pattern for "T," "D," "N," "J," and "Ch" sounds. Addition of wax or removal of palatal base material can be performed to modify contact areas and improve phonetics.



10 Well-adjusted denture base. Areas of tissue inflammation that do not correlate to areas of burn-through are most likely caused by tilting of dentures, possibly due to occlusal problems.

19. For elastomeric media, mark the exposed areas of the denture using a dampened tip of a disinfected red or blue pencil, so that the area remains indicated, should the polymerized elastomer catch the bur and tear or pull away from the denture.

20. Adjustment is complete when the area being evaluated has a relatively even pattern of contact (Fig. 10; compare with Fig. 3). Note that it is often not possible to achieve perfect adaptation of the base.[9] If interpretation of the indicating media is difficult, avoid adjustment until signs or symptoms appear, so as not to overadjust the denture.[6,9]

21. When discomfort accompa-

nies a pressure spot, do not ask the patient if the adjustment has made a problem "better," as the most likely response will be "yes." Rather, ask an unbiased question, such as, "How does that feel?" Then, if the patient states that the problem feels "better," ask the patient to rate the improvement in terms of a percentage.[5] Note that the patient should rate the improvement in comfort at close to 100% when the adjustment is complete, and, if the patient does not, further adjustment is most likely warranted. [5]

SUMMARY

Use of an indicating medium is one of several strategies that clinicians can employ for improving diagnosis and correction of denture-related problems. Denture adjustments are more accurate and effective when made using an indicating medium. The authors recommend that the use of pressure-indicating media for adjusting dentures should become routine.

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Noteworthy Abstracts of the Current Literature

Single-tooth replacement in the anterior maxilla by means of immediate implantation and provisionalization: A review

De Rouck T, Collys K, Cosyn J.
Int J Oral Maxillofac Implants 2008;23:897-904.

Objectives: The objective of this study was to assess to what extent the outcome of immediate implantation and provisionalization for replacing single maxillary teeth in the esthetic zone is favorable and predictable from biologic and esthetic points of view.

Material and Methods: An electronic search (MEDLINE and Cochrane Oral Health Group Specialized Trials Register) and a manual search were performed to detect studies concerning maxillary single-tooth replacements by means of dental implants immediately placed into fresh extraction sockets and provisionalized within the first 24 hours. Only full-text reports on clinical studies published in English up to June 2006 were included. Case reports and reviews on the topic of interest were excluded.

Results: Eleven studies were selected. Based on a qualitative data analysis, implant survival and even management of papilla levels seem predictable following immediate implantation and provisionalization. However, maintaining the midfacial gingival margin may be more problematic, since postextraction bone remodeling and therefore marginal gingival changes will occur irrespective of the timing of the placement of an implant. The long-term impact of this remodeling is currently unclear and needs to be elucidated in future research.

Conclusion: The clinician is recommended to be reserved when considering immediate implant placement and provisionalization for replacing single maxillary teeth in the anterior zone. At the very least, a number of guidelines and prerequisites need to be taken into consideration.

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