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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This paper explores 7 different factors which should be considered when prescribing the lower anterior prosthesis: alignment as seen from the incisal; height of the incisal edges; degree of irregularity of the teeth; character of the incisal edge; height of the cuspid; mesio-incisal angle of the cuspid, and ridge coverage. The weights and variations of these different factors are discussed and suggestions made for a complete work authorization.

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Diagnosis of the Aesthetic Components of the Mandibular Anterior Prosthesis

by

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INTRODUCTION

The aesthetic problems involved in the replacement of mandibular anterior teeth result from the relative lack of exposure of the average practitioner to the restorative need. The parameters, or designing aesthetic replacements of the maxillary anteriors, are well known and are taught as part of the general dental education from the time of a student's first denture set-up. The problems and requirements for a good aesthetic result of a mandibular anterior prosthesis are a separate entity and, in general, unappreciated.

This paper explores the various parameters which should be evaluated when designing and prescribing a mandibular anterior fixed prosthesis. This paper will not concern itself with the placement of the teeth to afford good function and phonetics but only with the finer arrangements after that tooth placement.

Data cited in this article is from previous research by the authors (Lorton and Whitbeck, 1981).

Seven categories encompass all of the characteristics which should be taken into account when prescribing or characterizing these mandibular prostheses.

1) Alignment as seen from the incisal:

Most natural dentitions exhibit either a smooth gentle curve or a slightly irregular curve (Fig 1a). This curve serves several aesthetic functions for a lower prosthesis. It conceals the interproximals, a difficult area to reproduce in

an aesthetic fashion; it breaks up the smooth plane of visible porcelain; it reflects light away from the observer and thus imparts a more natural appearance (Fig 1b). Lower anterior teeth that are aligned in a straight line from cuspid to cuspid are relatively uncommon (17.3%) although, where the maxillary dentition is classified as square, the percentage rises to 40.6

2) Height of the incisal edge: When viewed parallel to the occlusal plane, the natural dentition appears in one of three general patterns (Figs 2a, b, c). The incisors arch above the occlusal plane approximately 25% of the time (Fig 2a); they curve below it 25% of the time (Fig 2b); and they fall along the occlusal plane 50% of the time (Fig 2c). The height of the incisors in a prosthesis is generally determined by their anterior-posterior placement and inclination combined with phonetic needs. The significant point is that incisal edges may be aligned below the occlusal plane and still be correctly placed for a particular dentition.

3) Degree of irregularity: The presence and degree of mesial-distal overlap or irregularity varies in the natural dentition (Figs 3a, b, c) and occurs in about 46% of all cases. A degree of irregularity as indicated in Fig 3b is very appropriate in many prosthetic cases; it allows for creative staining techniques. The use of browns, oranges to simulate

the naturally occurring discolorations of the interproximal surfaces can be more easily integrated into an irregular arrangement where they serve to trick the eye. Large amounts of stain on a regular arrangement often attract the eye to the interproximals, the very area that is the least likely to appear natural. The overlaps hide the interproximal contacts or joinings and also serve to mask the lack of gingival papillae.

A high degree of irregularity, of which Figure 3b is a mild example, is characteristic of narrow highly tapered arches, and, although a m.a.f.p.d. with this arrangement may seen not to be an aesthetic replacement, it may be an extremely natural appearing replacement.

4) Character of incisal edge: The incisal edge characteristics have a high correlation with patient age. It would be incongruous to have a young appearing incisal edge complete with mamelons, as in Figure 4a, as part of a replacement for a 60-year-old patient. The decision about the design for esthetics of the incisal edge must include degree of wear (compare Figures 4a, 4b, and 4d) and height of individual edges (Figures 4b vs. 4c).

The incisal bevels characteristically present in older dentitions (Fig 4d) provide unique opportunities for characterization through staining.

5) Height of the cuspid: The lower cuspid height is not determined by the phonetic requirements. Although the position and inclination of the facial surface is determined by the occlusal scheme, the height of the incisal tip must be determined by the clinician in keeping with the occlusal needs. The cuspid tip may be lower than the incisors, as is often the case where the incisors are above the occlusal plane (#22 in Fig 5a), at the same height (#27 in Fig 5b or #22, 27 in Fig 2c).

6) Mesial-incisal angle of the cuspid: A significant failing in many mandibular prostheses is the lack of visual separation between the laterals and the cuspids. The mesial incisal angle of the lower cuspids is lower than the distal incisal corner of the laterals in many cases (Fig 6b). In cases that show little incisal edge wear, 88% of the cuspid/lateral contact areas were more apically positioned than the lateral/lateral contact areas. Even in cases where there was much wear, 66% of the cuspid/lateral contacts were lower than the lateral/central contacts. Unless this lower contact area is designed in the framework fabrication, it will be impossible to create the visual separation adequate for satisfactory aesthetics.

Any attempt to create this separation only in the porcelain will often result in exposure of the opaque

layer or the metal of the framework itself.

7) Ridge coverage inspection of Figures 2-6 will show that natural mandibular anterior teeth are enveloped by the gingiva to as great a degree as maxillary teeth. The average length of the gingival papilla is the same in the mandible and the maxilla; therefore, a prosthesis should have some degree of ridge coverage. This is a severe problem because of the high degree of ridge shrinkage and remodeling after tooth loss in the lower, but an attempt should be made to simulate the natural appearance. Pontics on a lower prosthesis should be contoured to the ridge in a similar fashion to maxillary prostheses. There is an unfortunate tendency to provide "bullet" pontics for lower prostheses which are glaringly obvious and artificial appearing because of the increasing tendency to reveal the necks of the lower teeth in older patients.

SUMMARY

This paper explores seven different factors which should be considered when prescribing the lower anterior prosthesis: alignment as seen from the incisal; height of the incisal edges; degree of irregularity of the teeth; character of the incisal edge; height of the cuspid; mesio-incisal angle of the cuspid; and ridge coverage. The weights and variations of these different factors are discussed and suggestions made for a complete work authorization.

These factors must be accounted for, and prescribed for, on the laboratory work authorization form to insure adequate aesthetic results. It is not enough to try to correct basic inadequacy in aesthetics stemming from a lack of complete instructions to the laboratory. In addition to instructions for the dental laboratory technicians regarding occlusion, shade and pontic morphology, the seven factors listed above should be addressed directly by the clinician to aid the technician in the quest for harmonious esthetics. Although most clinicians do or should make minor changes in outline form, surface anatomy shade, staining, or characterization, etc., major changes due to incomplete communication between clinician and technician should not be necessary. Basic desired position and contour may be carefully developed by alterations of a stone cast of a previous fixed, removable, or transitional partial denture. If this is not available, the desired results should be illustrated with diagnostic set-up or wax-up on a preliminary cast or a duplicate master cast (Figures 7a, 7b).

In the quest for the desired harmonious esthetics created by the replacement of mandibular anterior teeth, direct visual aids (by casts, wax-ups, set-ups, and drawings) for the technician are essential.

TO EDITOR: Please consider first paragraph of summary as the abstract for use at the head of the paper.

Thank you,
L. Lorton

REFERENCES:

LORTON, L. AND WHITBECK, P. (1981) Esthetic parameters of mandibular anterior teeth. Journal of Prosthetic Dentistry, 46, 2.

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Figure 1a & 1b

Figure 2a, 2b, 2c

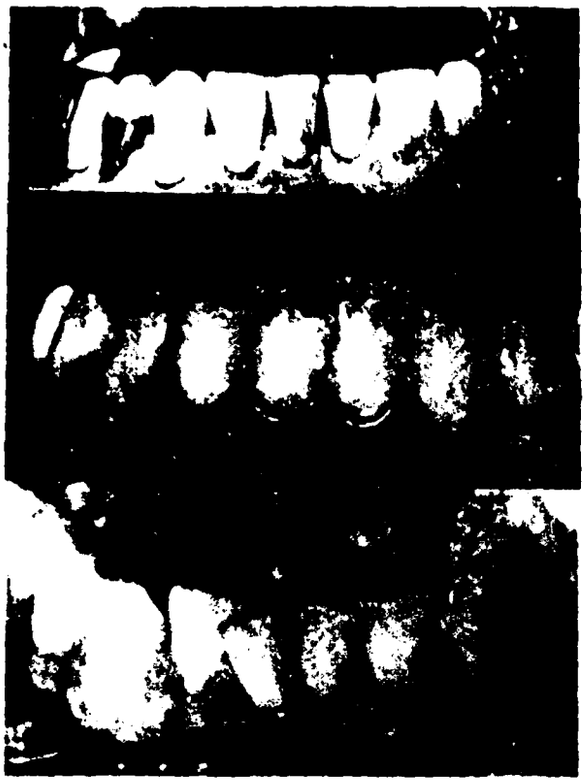


Figure 3a, 3b, 3c

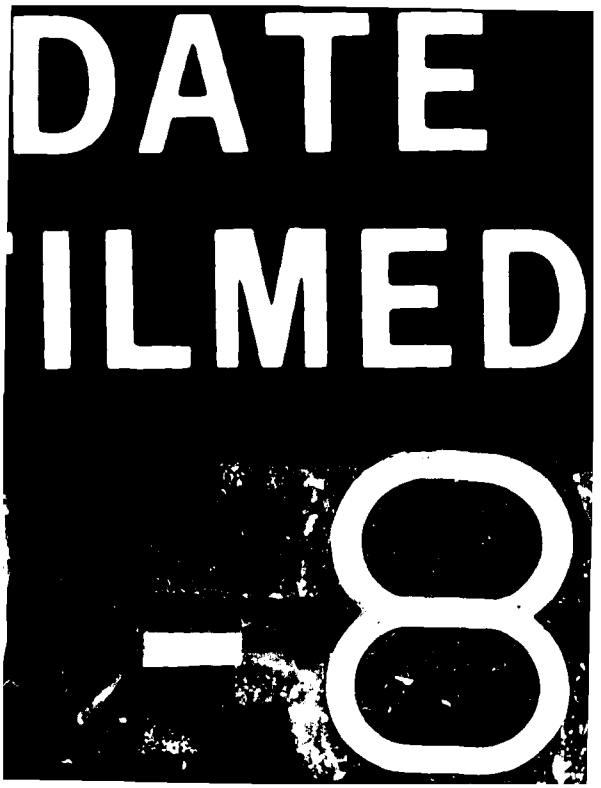
Figure 4a, 4b, 4c, 4d

Figure 5a, 5b

Figure 6a, 6b

Figure 7a

Figure 7b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