Communicating Complexity:
Using a Diagnostic Classification System
for Edentulous Patients

(Savoir expliquer les traitements complexes : Utilisation d'un système de classification des diagnostics pour les patients édentés)

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S o m m a i r e

Les dentistes qui exercent en cabinet privé et dans les facultés de médecine dentaire ont à traiter un nombre appréciable de patients édentés qui requièrent des traitements complexes. Le Collège américain des prosthodontistes a élaboré un système de classification de l'édentation complète, qui peut guider la planification du traitement global et la prise en charge des patients avec des prothèses complètes. Ce système repose sur des variables de diagnostic précises et fait appel à un modèle basé sur une liste de contrôle qui peut être appliqué facilement et rapidement. Même s'il existe à ce jour peu de données publiées permettant d'établir un lien direct entre la classification et le pronostic, le système peut néanmoins être utilisé par les étudiants en médecine dentaire et les dentistes praticiens pour déterminer les caractéristiques démographiques des patients édentés. De fait, le système a notamment été utilisé par des étudiants de premier cycle d'une école de médecine dentaire, pour déterminer la pertinence d'un traitement pour des patients et diriger les patients ayant besoin de traitements complexes vers une équipe enseignant-étudiant appropriée. Le fait de discuter du système de classification avec les patients aide en outre le dentiste à expliquer la complexité du traitement requis et pourrait aussi faciliter la conciliation attentes-résultats.

Mots clés MeSH : *denture, complete; mouth, edentulous/classification; patient care planning*

The need for complete dentures, and consequently the need for training in the fabrication of complete dentures, will not decline in the foreseeable future. Although the proportion of the total population with complete dentures has declined, this decline has been offset by the increase in the overall population, in particular the increase in the older adult population who have complete dentures, and by specific patient groups who choose complete denture therapy for socio-economic reasons. Two recent articles in the *Journal of Prosthetic Dentistry*[1,2] provide convincing evidence of a significant continuing need for complete denture services in North America, a need that may largely go unmet because of a projected decrease in dental practitioners. The general practitioner may thus be expected to provide more rather then less service in the area of complete dentures; otherwise, the profession runs the risk that this area of dentistry will be lost to alternative providers. To encourage practitioners to maintain or increase their interest and skills in the area of complete dentures will require the provision of continuing education for dentists and dental laboratory technicians in all areas of complete denture prosthodontics and the development of reasonable treatment fees and fee guides that offer sufficient compensation for providing these services.

Given the changing demographics of the patients who use complete dentures (i.e., patients are older, with more years of denture wear and more medical problems) the complexity of treatment can be expected to increase. The greater time required to manage and satisfy the needs of patients with complete dentures, as well as the greater responsibilities associated with such care, requires compensation commensurate with the task.
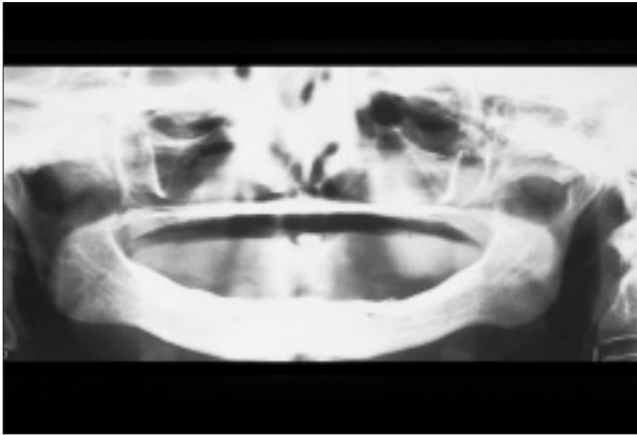
Figure 1 : *Class I. Mandibular bone height 21 mm or greater.*
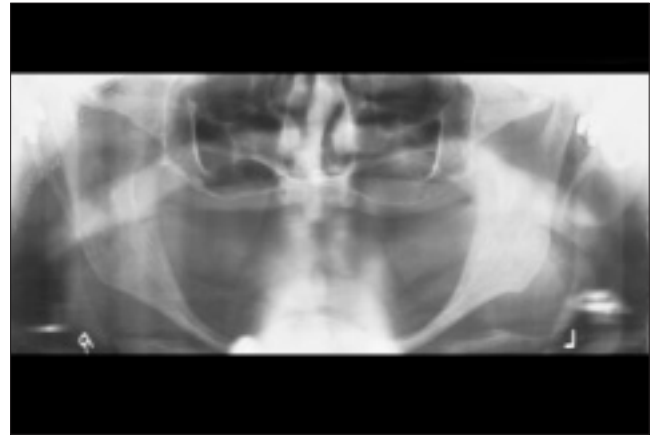
Figure 2: *Class IV. Mandibular bone height 10 mm or less*

Figure 3: *Class IV. No anterior or posterior vestibule.*

Figure 4: *Class IV. Redundant tissue. Major soft-tissue revision required.*

Providing complete denture therapy that reflects the needs of individual patients is not a new concept; however, both third-party payers and patients appear to believe that "one fee fits all," an unreasonable assumption that should be challenged. A formal system of classifying edentulous patients might help in this regard. Determining patients' treatment needs according to preset criteria may help in setting a reasonable fee for treatment and in identifying patients who are best treated by means of referral to a prosthodontist.

Reasons for a Classification System

Classifying edentulous patients according to preset criteria can be an aid in numerous aspects of treatment:

- establishing a basis for diagnostic and treatment procedures
- justifying treatment procedures and fees to third-party payers and patients
- screening patients treated in dental faculties for assignment to undergraduate or graduate students
- providing data for review of treatment outcome
- simplifying communication in discussions of treatment with patients and colleagues.

The American College of Prosthodontists (ACP) has developed a classification system for complete edentulism that is based on specific diagnostic criteria. Edentulism is divided into 4 levels of difficulty or complexity: Classes I, II, III and IV. Class IV designates patients who require the most difficult degree or complexity of treatment. The classes are differentiated from each other according to the following features:[3]

- The skill level required to treat that class of patient: Does the patient require novice or expert treatment?
- The necessity for modification of basic clinical or laboratory procedures: Will more complicated procedures or more time be required for treatment?
- Overall management and complexity of treatment: Will expert intervention and referral be required?

A brief summary of the salient features of the classification system is provided here. For a comprehensive review of the rationale for developing the system, application of the system and the diagnostic criteria used, the reader is directed to the original references.[3,4]

Table 1 **Diagnostic criteria for Class III patients**

Diagnostic variable	Criterion	No. of patients
Mandibular bone height	Class III	9
Maxillary ridge morphology	Type C	5
Mandibular muscle attachment	Type C	11
Maxillomandibular relationship	Class III	10
Soft-tissue procedures required	Minor	1
Interarch space	Limited (18–20 mm)	2
Tongue	Large	4
Modifying variable	Not specified	4
Total		**29**

Table 2 **Diagnostic criteria for Class IV patients**

Diagnostic variable	Criterion	No. of patients
Mandibular bone height	Class IV	14
Maxillary ridge morphology	Type D	0
Mandibular muscle attachment	Type D or E	7
Maxillomandibular relationship	Class III	6
Soft-tissue procedures required	Minor	1
Interarch space	Limited (18–20 mm)	0
Tongue	Large	1
Modifying variable	Not specified	6
Total		**20**

Diagnostic Criteria for Classifying Patients

To apply the classification system, the clinician uses a checklist or worksheet to focus attention on specific diagnostic variables. The items in the checklist are ordered according to the objectivity of their assessment (i.e., the ease with which they can be measured and assessed), not their order of significance. The following diagnostic variables, in descending order of objectivity, are used:

- mandibular bone height, measured radiographically (**Figs. 1** and **2**)
- morphologic features of the maxillary residual ridge (**Figs. 3** and **4**)
- mandibular muscle attachment
- maxillomandibular relationship
- presence of conditions requiring preprosthetic surgery
- interarch space
- tongue anatomy
- modifying variables, such as systemic disease, psychosocial factors or temporomandibular disorders (TMD).

Explicit guidelines are provided on the worksheet[3,4] to guide the practitioner in applying the classification system.

Use of the Classification System

Practitioners who want to use the classification system should consult the original references[3,4] and make copies of the worksheet for their own use. The worksheet is usually completed at the time of the initial screening appointment. It focuses the examination on the specific diagnostic variables required and allows rapid classification of patients. If there are problems in determining the patient's status in any particular category, the practitioner should leave that item blank and continue with the rest of the items. This is a "no-tolerance" type of classification system, and as such a single variable with a complex rating is enough to classify the patient in a more complex (higher-level) category. No-tolerance systems emphasize the impact of each variable on the overall determination of class, and the final classification is determined by the variable with the highest level of complexity. For instance, a patient with less

then 10 mm of residual bone height would be assigned to Class IV (**Fig. 2**), the most complex category, no matter how favourable the rest of the variables. It is important to complete as much of the worksheet as possible because this yields an individualized patient profile that will help in determining the prognosis and formulating the treatment plan, as well as assisting in communications with the patient.

Example of Application of the System in an Undergraduate Clinic

All 76 patients examined in the third-year complete-denture clinic at the University of Manitoba's faculty of dentistry from January 2002 to January 2003 were classified using the ACP classification system. There were 12 patients in Class I (least complex), 15 in Class II, 29 in Class III and 20 in Class IV (most complex).

Data on the diagnostic variables used in the classification of Class III and Class IV patients are presented in **Tables 1** and **2**.

Most patients had more then one diagnostic variable by which they were categorized as Class III or Class IV. Aspects of the anatomy of the mandibular ridge (either bone height or muscle attachment) were the variables most commonly determining these classifications.

Modifying variables are variables that would make conventional treatment or patient management very difficult, such as severe systemic disease, major psychosocial problems requiring professional intervention, severe TMD symptoms, maxillofacial defects and patients whose dental problems have been refractory to previous treatment. Most of the patients designated as Class III or Class IV on the basis of a modifying variable had conditions refractory to previous treatment, for example, patients who were dissatisfied with previous appropriate treatment, patients who had gone without any prosthesis for many years, patients who were unable or unwilling to wear dentures, and patients whose expectations were unlikely to be met given their previous intolerance of conventional complete dentures.

The ACP classification system has been used to determine the suitability of patients for treatment by undergraduates,

to assign patients to staff–student pairs and, most importantly, to heighten the awareness of all those involved as to the complexity of treatment undertaken in the undergraduate clinic. Discussion of the classification with the student and the patient during the treatment planning appointments has emphasized the unique aspects of each individual's treatment. Students and staff know from the outset the complexity of the cases and also have an indication of cases with an unfavourable prognosis.

Three patients categorized as Class IV on the basis of multiple variables were deemed inappropriate for undergraduate treatment; however, the other 73 patients were eventually treated in the undergraduate clinic. The complex Class IV patients were assigned to students supervised by full-time prosthodontic staff members. Although any treatment given at this level of the curriculum requires constant supervision, management of Class IV patients requires additional judicious hands-on intervention by staff, notably when the final impression for the mandibular arch is being made. If there were an abundance of edentulous patients available for treatment at this level of the undergraduate curriculum, it would be desirable to refer more of the complex Class IV patients for graduate or specialist care. However, a review of the patients treated from January 2002 to January 2003 revealed only 6 cases in which treatment was deemed an early failure, where success was determined by patient satisfaction, and treatment was deemed a failure when the patient was unable to wear the dentures for any reason. There did not appear to be any correlation between the patient's classification and the failure rate. Of the 6 patients with early failure, 3 were unsatisfied with the esthetic appearance of the dentures, 1 was unsatisfied with the substitution of resin denture teeth for their previous porcelain teeth, 1 found the new denture uncomfortable, and 1 was unable to accommodate to wearing the denture because of gagging. Only one of these patients was a Class IV patient. The patient had never worn dentures, had a severe Class II maxillomandibular relationship, had unreasonable esthetic expectations, had severe gagging and had a problem with alcohol abuse.

Experience in the undergraduate clinic indicates that patient management, specifically meeting patients' expectations with regard to esthetic appearance, had a greater impact than the students' ability to carry out the clinical and technical procedures related to fabrication of technically acceptable dentures. In other words, it was far easier to manage the oral anatomy than the patients' expectations. It will be interesting to see if this early anecdotal observation persists as additional reports of the validity of the ACP classification are published. So far, there do not appear to be any published reports correlating classification criteria with treatment success. The next stage of the project at the University of Manitoba is to assess outcomes at recall appointments and to determine whether there is a relationship between classification of edentulism and prognosis. ✎

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Les auteurs n'ont aucun intérêt déclaré financier.

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