Classification system for completely edentulous patients

Completely edentulous patients exhibit a broad range of physical variations and health concerns. Classifying all edentulous patients as a single diagnostic group is insensitive to the multiple levels of physical variation and the differing treatment procedures required to restore function and comfort. A graduated classification of complete edentulism has been developed that describes varying levels of loss of denture supporting structures.

Complete edentulism defines as follows: the physical state of the jaw(s) following removal of all erupted teeth and the condition of the supporting structures available for reconstructive or replacement therapies.

The American College of Prosthodontists (ACP), has developed a classification system for complete edentulism based on diagnostic findings. These guidelines may help practitioners determine appropriate treatments for their patients. Four categories are defined, ranging from Class I to Class IV, with Class I representing an uncomplicated clinical situation and a Class **IV** patient representing the most complex and higher-risk situation. Each class is differentiated by specific diagnostic criteria. This system is designed for use by dental professionals who are involved in the diagnosis of patients requiring treatment for complete edentulism.

Potential benefits of the system include:

1. Better patient care.
2. Improved professional communication.
3. More appropriate insurance reimbursement.
4. A better screening tool to assist dental school admission clinics.
5. Standardized criteria for outcomes assessment.

Development of the classification system:

A review of the prosthodontic literature was used to identify the many variables associated with complete edentulism. These variables were differentiated into four subclasses:

1. Physical findings. 2. Prosthetic history.
3. Pharmaceutical history. 4. Systemic disease evaluation.

Reasons for a Classification System

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

• establishing a basis for diagnostic and treatment procedures

• justifying treatment procedures and fees to 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.

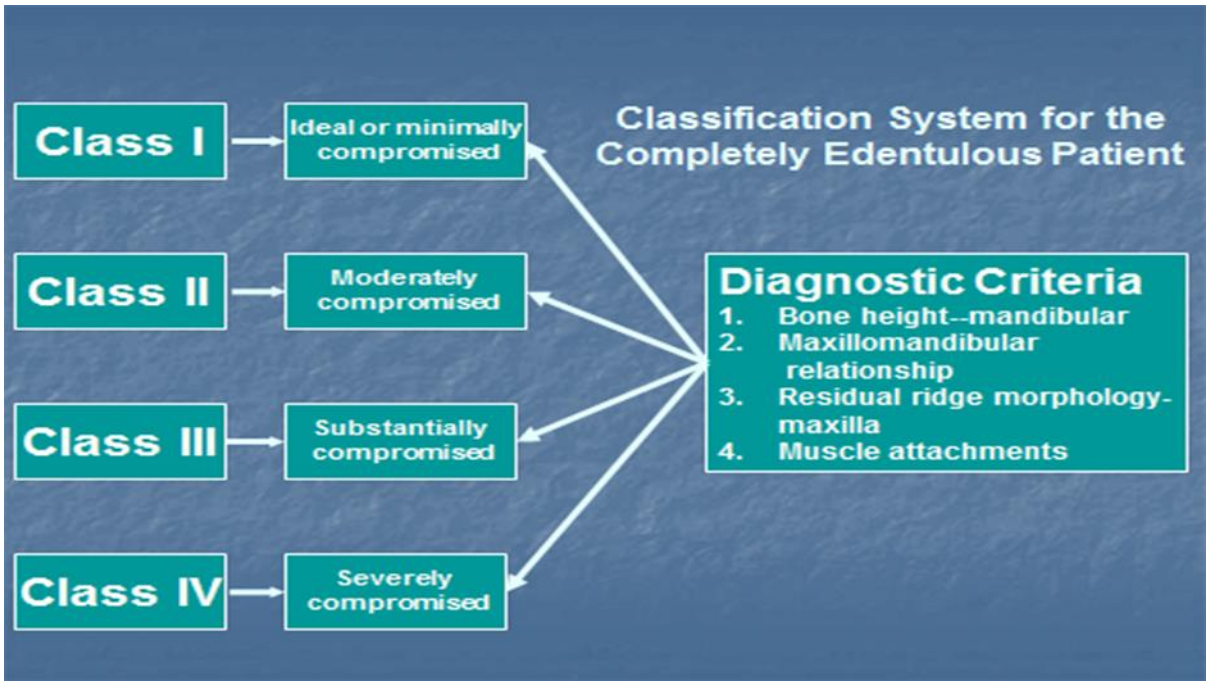
A classification system was developed based on the most objective variables. The classification system will be subject to monitoring and revision as new diagnostic and treatment information becomes available in the literature.

Diagnostic Criteria

The diagnostic criteria are organized by their objective nature and not in their rank of significance. Because of variations in adaptive responses, certain criteria are more significant than others. However, objective criteria will allow for the most accurate application of the classification system and measurement of its efficacy.

The diagnostic criteria used in the classification system are:

1. Bone height-mandible.
2. Maxillomandibular relationship.
3. Residual ridge morphology-maxilla.
4. Muscle attachments-mandible.



Bone height-mandible only:

The identification and measurement of residual bone height is the most easily quantified objective criterion for the mandibular edentulous ridge. In addition, it represents a measurement of the chronic debilitation associated with complete edentulism in the mandible. Despite the lack of a known etiology, it has been established that the loss of denture supporting structures does occur. Atwood‘s description in 1971 of alveolar bone loss is still applicable today: “Chronic progressive, irreversible and disabling process probably of multifactoral origin. At the present time, the importance of various cofactors is unknown.” The continued decrease in bone volume affects:

1. Denture-bearing area.
2. Tissues remaining for reconstruction.
3. Facial muscle support/attachment.
4. Total facial height.
5. Ridge morphology.

The results of a radiographic survey of residual bone height measurement are affected by the variation in the radiographic techniques and magnification of panoramic machines of different manufacturers.
To minimize variability in radiographic techniques, the measurement should be made on the radiograph at that portion of the mandible of the least vertical height. The values assigned to each of the four types listed below are averages that historically have been used in relation to preprosthetic surgical procedures. A measurement is made and the patient is classified as follows:

Type I (most favourable): residual bone height of 21mm or greater measured at the least vertical height of the mandible.

Type II: residual bone height of 16 to 20 mm measured at the least vertical height of the mandible.

Type III: residual alveolar bone height of 11 to 15mm measured at the least vertical height of the mandible.

Type lV: residual vertical bone height of 10 mm or less measured at the least vertical height of the mandible.

Residual ridge morphology-maxilla only:

Residual ridge morphology is the most objective criterion for the maxilla, because measurement of the maxillary residual bone height by radiography is not reliable." The classification system continues on a logical progression, describing the effects of residual ridge morphology and the influence of musculature on a maxillary denture.

Type A (most favorable):

1. Anterior labial and posterior buccal vestibular depth that resists vertical and horizontal movement of the denture base.
2. Palatal morphology resists vertical and horizontal movement of the denture base.
3. Sufficient tuberosity definition to resist vertical and horizontal movement of the denture base.
4. Hamular notch is well defined to establish the posterior extension of the denture base.

5. Absence of tori or exostoses.

Type B:

1. Loss of posterior buccal vestibule.
2. Palatal vault morphology resists vertical and horizontal movement of the denture base.
3. Tuberosity and hamular notch are poorly defined, compromising delineation of the posterior extension of the denture base.
4. Maxillary palatal tori and/or lateral exostoses are rounded and do not affect the posterior extension of the denture base.

Type C:

1. Loss of anterior labial vestibule.
2. Palatal vault morphology offers minimal resistance to vertical and horizontal movement of the denture base.
3. Maxillary palatal tori and/or lateral exostoses with bony undercuts that do not affect the posterior extension of the denture base.
4. Hyperplastic, mobile anterior ridge offers minimum support and stability of the denture base.
5. Reduction of the post malar space by the coronoid process during mandibular opening and/or excursive movements.

Type D:

1. Loss of anterior labial and posterior buccal vestibules.
2. Palatal vault morphology does not resist vertical or horizontal movement of the denture base.
3. Maxillary palatal tori and/or lateral exostoses"(rounded or undercut) that interfere with the posterior border of the denture.
4. Hyperplastic, redundant anterior ridge.
5. Prominent anterior nasal spine.

Muscle Attachments: Mandible only

The effects of muscle attachment and location are most important to the function of a mandibular denture. These characteristics are difficult to quantify. The classification system follows a logical progression to describe the effects of muscular influence on a mandibular denture. The clinician examines the patient and selects the category that is most descriptive of the mandibular muscle attachments.

Type A (most favorable):

1. Attached mucosal base without undue muscular impingement during normal function in all regions.

Type B:

1. Attached mucosal base in all regions except labial from canine to canine.
2. Mentalis muscle attachment near crest of alveolar vestibule ridge.

Type C:

1. Attached mucosal base in all regions except anterior buccal and lingual vestibules-canine to canine.
2. Genioglossus and mentalis muscle attachments near crest of alveolar ridge.

Type D:

1. Attached mucosal base only in the posterior lingual region.
2. Mucosal base in all other regions is detached.

Type E:

No attached mucosa in any region.

Maxillomandibular Relationship

The classification of the maxillomandibular relationship characterizes the position of the artificial teeth in relation to the residual ridge and/or to opposing dentition. Examine the patient and assign a class as follows:

Class I (most favorable):

Maxillomandibular relation allows tooth position that has normal articulation with the teeth supported by the residual ridge.

Class II:

Maxillomandibular relation requires tooth position outside the normal ridge relation to attain esthetics, phonetics, and articulation (e.g., anterior or posterior tooth position is not supported by the residual ridge; anterior vertical and/or horizontal overlap exceeds the principles of fully balanced articulation).

Class III:

Maxillomandibular relation requires tooth position outside the normal ridge relation to attain esthetics, phonetics, and articulation (i.e. cross

bite-anterior or posterior tooth position is not supported by the residual ridge).

Diagnostic Classification of Complete Edentulism

Class I

This classification level characterizes the stage of edentulism that is most appear to be successfully treated with complete dentures using conventional prosthodontics techniques. All four of the diagnostic criteria are favorable.

- Residual bone height of 21 mm or greater measured at the least vertical height of the mandible on a panoramic radiograph.
- Residual ridge morphology resists horizontal and vertical movement of the denture base; Type A maxilla.
- Location of muscle attachments that are conducive to denture base stability and retention; Type A or B mandible.
- Class I maxillomandibular relationship

Class II (Fig 15 A-H)

This classification level distinguishes itself by the continued physical degradation of the denture supporting anatomy, and, in addition, is characterized by the early onset of systemic disease interactions,

patient management, and/or lifestyle considerations.

- Residual bone height of 16 to 20 mm measured at the least vertical height of the mandible on a panoramic radiograph.
- Residual ridge morphology that resists horizontal and vertical movement of the denture base; Type A or B maxilla.
- Location of muscle attachments with limited influence on denture base stability and retention; Type A or B mandible.
- Class I maxillomandibular relationship.
- Minor modifiers, psychosocial considerations, mild systemic disease with oral manifestation.

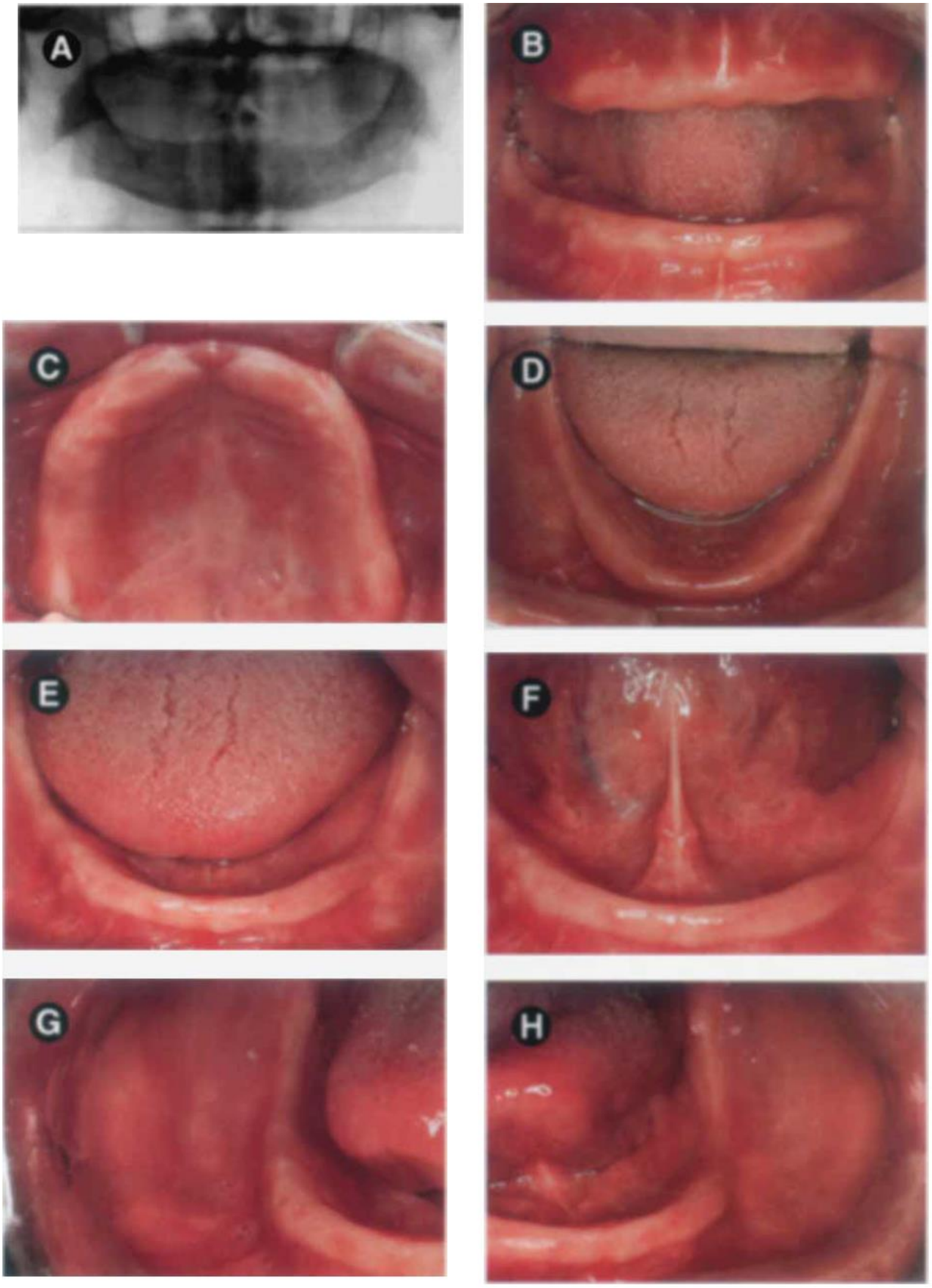


Figure 14. Class I patient. (*A*) Panoramic radiograph. (*B*) Facial view at the approximate occlusal vertical dimension. (*C*) Occlusal view: maxillary arch. (*D*) Occlusal view: mandibular arch. (*E*) Facial view: tongue in resting position. (*F*) Facial view: tongue elevated. (*G*) Lateral view of mandible: patient right. (*H*) Lateral view of mandible: patient left.

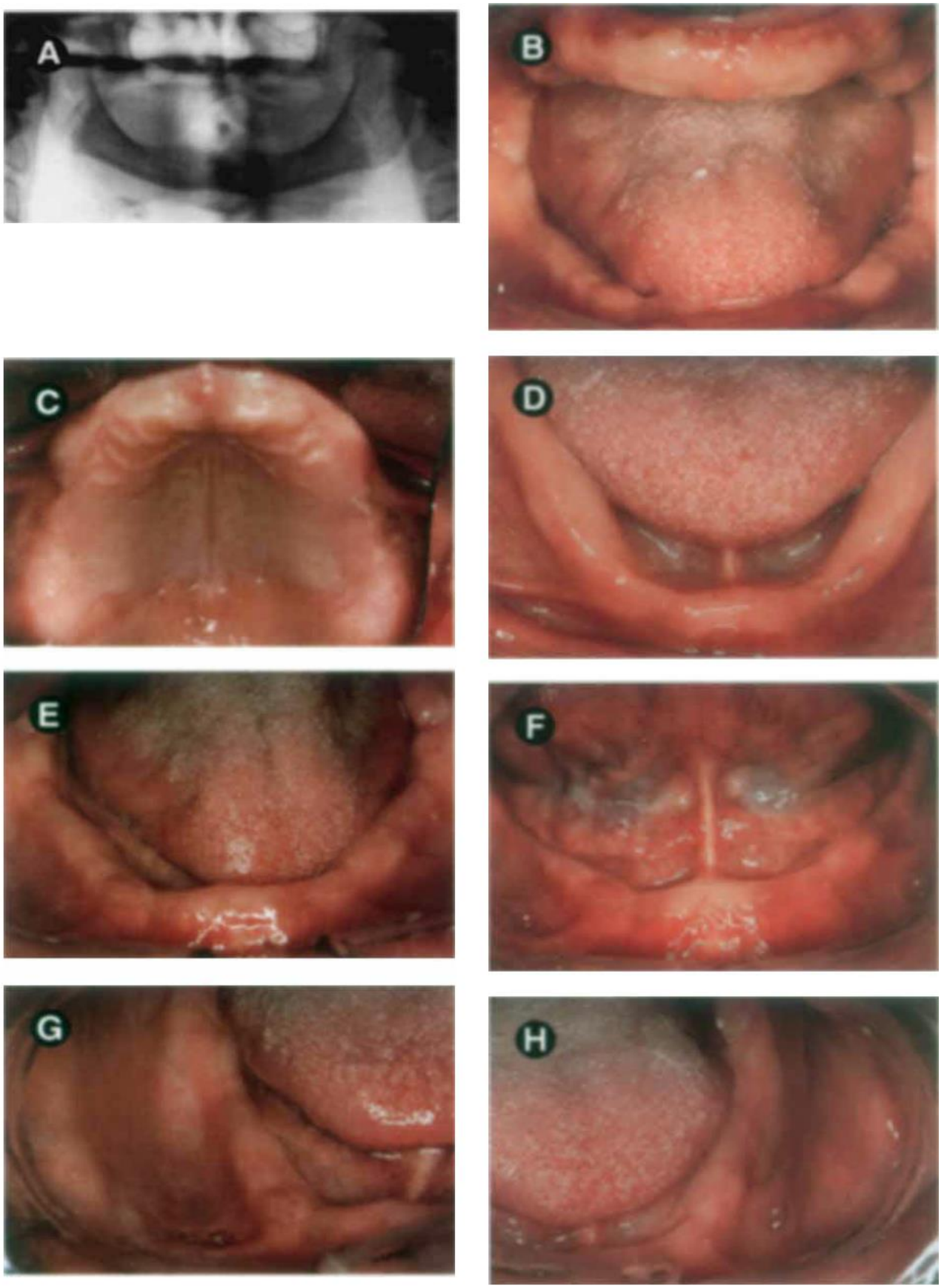


Figure 15. Class II patient. (*A*) Panoramic radiograph. (*B*) Facial view at the approximate occlusal vertical dimension. (*C*) Occlusal view: maxillary arch. (*D*) Occlusal view: mandibular arch. (*E*) Facial view: tongue in resting position. (*F*) Facial view: tongue elevated. (*G*) Lateral view of mandible: patient right. (*H*) Lateral view of mandible: patient left.

Class III

This classification level is characterized by the need for surgical revision of supporting structures to allow for adequate prosthodontic function. Additional factors now play a significant role in treatment outcomes.

- Residual alveolar bone height of 11 to 15 mm measured at the least vertical height of the mandible on a panoramic radiograph.
- Residual ridge morphology has minimum influence to resist horizontal or vertical movement of the denture base;

Type C maxilla.

- Location of muscle attachments with moderate influence on denture base stability and retention;Type C mandible.
- Class I, II, or III maxillomandibular relationship.
- Conditions requiring preprosthetic surgery:

1) minor soft tissue procedures;

2) minor hard tissue procedures including alveolotomy.

3) simple implant placement, no augmentation

4) multiple extractions leading to complete edentulism for immediate denture placement.

- Limited interarch space (18-20 mm).
- Moderate psychosocial consideration and or moderate oral manifestations of systemic diseases or conditions such as xerostomia
- TMD symptoms present.
- Large tongue (occludes interdental space) with or without hyperactivity.
- Hyperactive gag reflex.

Class IV

This classification level depicts the most debilitated edentulous condition. Surgical reconstruction is almost always indicated but cannot always be accomplished because of the patient's health, preferences,

dental history, and financial considerations. When surgical revision is not an option, prosthodontics techniques of a specialized nature must be used to achieve an adequate treatment outcome.

- Residual vertical bone height of 10 mm or less measured at the least vertical height of the mandible on a panoramic radiograph.
- Residual ridge offers no resistance to horizontal or vertical movement; Type D maxilla.
- Muscle attachment location that can be expected to have significant influence on denture base stability and retention; Type D or E mandible.
- Class I, II, or III maxillomandibular relationships.
- Major conditions requiring preprosthetic surgery:

I) complex implant placement, augmentation

2) surgical correction of dentofacial deformities;

3) hard tissue augmentation required;

4) major soft tissue revision required, ie, vestibular extensions with or without soft tissue grafting.

- History of paresthesia or dysesthesia.
- Insufficient interarch space with surgical correction required.
- Acquired or congenital maxillofacial defects.
- Severe oral manifestation of systemic disease or conditions such as sequelae from oncological treatment.
- Maxillo-mandibular ataxia (incoordination).
- Hyperactivity of tongue that can be associated with a retracted tongue position and/or its associated morphology.
- Hyperactive gag reflex managed with medication.
- Refractory patient (a patient who presents with chronic complaints following appropriate therapy).

These patients may continue to have difficult achieving their treatment expectations despite the thoroughness or frequency of the treatments provided.

- Psychosocial conditions warranting professional intervention

Integration of Diagnostic Findings

The previous four sub classifications are important determinants in the overall diagnostic classification of complete edentulism. In addition, variables that can be expected to contribute to increased treatment difficulty are distributed across all classifications according to their significance.

The classes are differentiated from each other according to the following features:

• 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?

Prosthodontic Diagnostic Index(PDI) Classification System

Prosthodontic Diagnostic Index Complete Edentulism Checklist					
		Class I	**Class II**	**Class III**	**Class IV**
Bone Height-Mandibular					
	21 mm or greater				
	16-20 mm				
	11-15 mm				
	10 mm or less				
Ridge Morphology-Maxilla					
	Type A-resists vertical & horizontal, hamular notch, no tori				
	Type B-no buc vest, poor hamular notch no tori				
	Type C-no ant vest, min support, mobile ant ridge				
	Type D-no ant/post vest, tori,redundant tissue				
Muscle Attachments-Mandibular					
	Type A-adequate attached mucosa				
	Type B-no b attach mucosa (22-27), +mentalis m				
	Type C-no ant b&l vest (22-27), +genio & mentalis m				
	Type D-att mucosa in post only				
	Type E-no att mucosa, cheek/lip moves tongue				
Maxillomandibular Relationships					
	Class I				
	Class II				
	Class III				
Conditions Requiring Preprosthetic Surgery					
	Minor soft tissue procedures				
	Minor hard tissue procedures				
	Implants - simple				
	Implants with bone graft - complex				
	Correction of dentofacial deformities				
	Hard tissue augmentation				
	Major soft tissue revisions				
Limited Interarch Space					
	18-20 mm				
	Surgical correction needed				
Tongue Anatomy					
	Large (occludes interdental space)				
	Hyperactive- with retracted position				
Modifiers					
	Oral manifestation of systemic disease				
	Mild				
	Moderate				
	Severe				
	Psychosocial				
	Moderate				
	Severe				
	TMD Symptoms				
	Hx of paresthesia or dysesthesia				
	Maxillofacial defects				
	Ataxia				
	Refractory Patient				
ICD-9-CM Diagnostic Codes		525.41	525.42	525.43	525.44

Guidelines for use of the worksheet

1. Any single criterion of a more complex class places the patient into the more complex class.
2. Initial preprosthetic treatment and/or adjunctive therapy can change the initial classification level.
3. In the situation where the patient presents with an edentulous maxilla opposing a partially edentulous mandible, each arch is diagnosed with the appropriate classification system.