

# Classification system for partial edentulism: ABC classification

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## Abstract

**Objectives:** This article proposes a classification system for partial edentulism according to criteria of patient's efficiency, sufficiency and functional deficits

**Methods:** The ABC classification is based on a critical analysis of functional units premolars and molars in antagonism between them. The indispensable diagnostic tools are the visit of patient, diagnostic imaging tests and model analysis in antagonism to each other.

**Results:** Classification proposal. The classification recognizes and classifies three distinct functional levels identifying them with a letter and a standardized color code. Class A (green) represents an anatomical condition that allows bilateral masticatory function; Class B (yellow) identifies bilateral edentulous conditions and represents a condition of functional sufficiency. Class C (red) represents the condition of functional insufficiency.

**Conclusions:** The ABC classification represents a rapid pre-diagnostic tool capable of identifying 3 levels of difficulty of the clinical case: progressively, proceeding from green to red, the clinician can ideally foresee the series of pretreatments and the level of difficulty in prosthetic acceptance of every single individual. The classification is proposed as a general guideline with which to analyze advantages and disadvantages of different therapeutic alternatives, but also as an effective communication tool with the patient.

**Keywords:** Partial edentulism, masticatory function, functional unit, prosthetic acceptance.

## Introduction

The functional tooth unit is a concept described by Eichner, accepted and applied constantly up to the present day. The functional units are a pair of premolars or molars of intact anatomy in correct inter-arch relationship<sup>1-2</sup>. Eichner's classification of edentulism, in its full version, was born for epidemiological purposes in the pre-implant era and, although it still represents an effective and appreciated tool, it requires high prosthetic skills to be converted into a clinical method of daily work. Furthermore, it has recently been criticized for the modest level of scientific evidence it offers<sup>2</sup>. The classification proposal is based on critical analysis of functional units in partial edentulism and is the result of the observation of the growth of subjective prosthetic dissatisfaction manifested by numerous patients rehabilitated with removable prosthetic therapy, mainly in Emilia Romagna, after 2012. In a short time we realized that we had higher prosthetic failure rates with the same objective prosthetic parameters; moreover, the phenomenon appeared almost independent of the level of clinical experience of the operators. Patients with prosthetic dissatisfaction or rejection showed common characteristics, summarized with typical clinical histories, identifiable both on the basis of psychosocial parameters and on anatomical indications<sup>3-5</sup>. In this paper we aim to report the salient points of the classification system for partial edentulism according to criteria of patient's efficiency, sufficiency and functional deficits with the intention of proposing a useful and immediate tool in defining the complexity of the clinical case and the predictability in terms of therapeutic success. The result is a simple analysis model, merged into the "Theory of Simplified Models" and summarized by the ABC classification, described below.

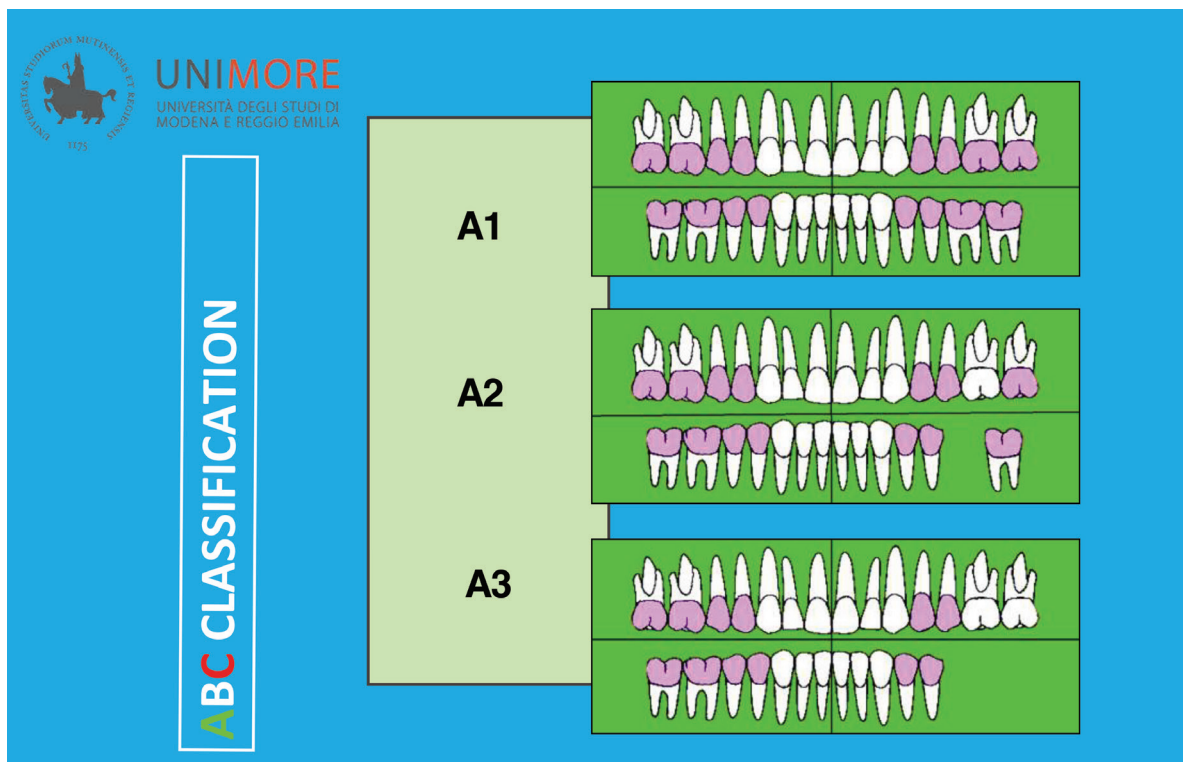
### Methods

The classification system for partial edentulism is based on a critical analysis of functional units premolars and molars in antagonism between them. Implant-prosthetic crowns and fixed prosthetic restorations of natural elements are also considered functional units. No acrylic or ceramic tooth of partial or total removable prosthesis can be assimilated to an occlusal unit. It is conventionally established that an occlusal unit molar (i.e. a pair of molars in antagonism physiological) has value 2 and a premolar has value 1, while a natural tooth abraded, rotated, ectopic or summarily rehabilitated with disfigurement of the normal anatomy, has a value of 0. The third molars, when they meet the functional requirements indicated above, are considered similarly to the first and second molars<sup>6</sup>. Finally, it is established that the central incisors, the lateral ones and the canines have a value of 0 in terms of functional unit. The diagnostic tools essential to the case study are the visit of patient, diagnostic imaging tests and the analysis of the plaster models in antagonism with each other. The classification recognizes and classifies three distinct functional levels, defined as “classes” or “series”, identifying them with a letter and a standardized color code.

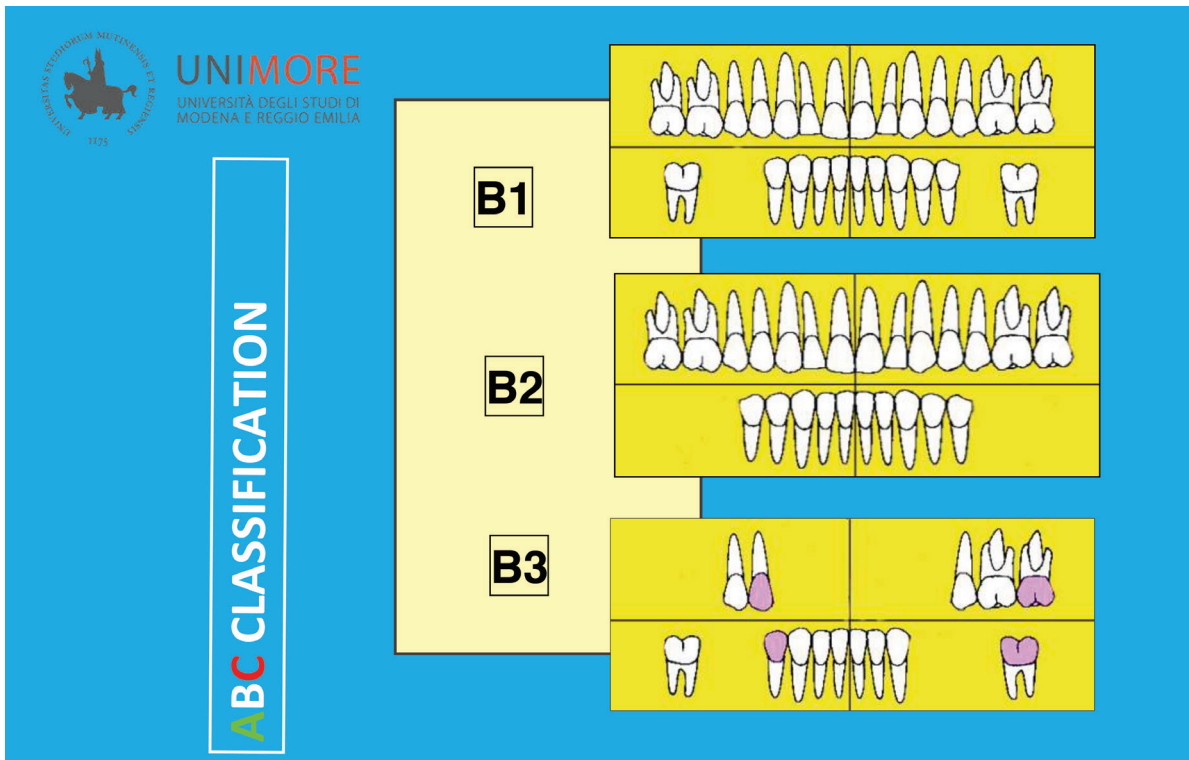
### Results

The first class, coded by the letter A, is marked green in color and identifies the conditions of functional excellence. The subject in class A by definition presents an anatomical condition that allows bilateral masticatory function (Fig. 1). Series A identifies three distinct conditions called

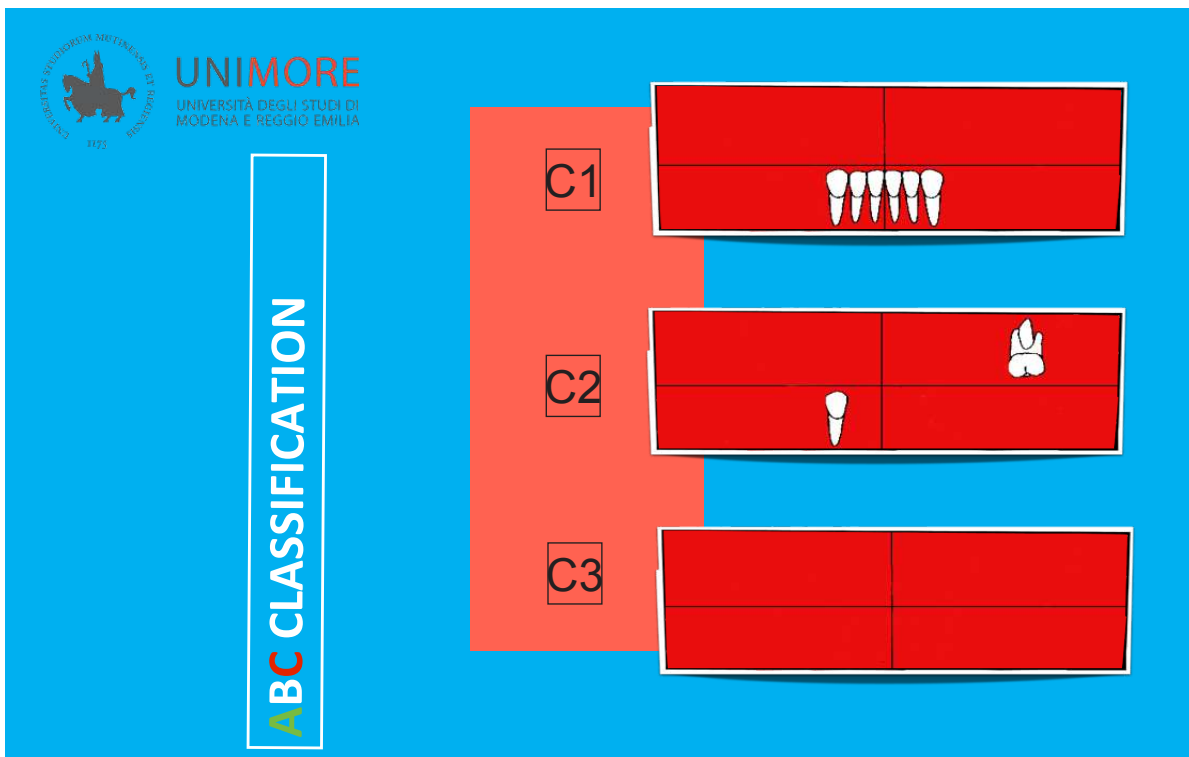
simplified models: A1: condition of intact dentition in normal occlusion with maximum number of functional units bilaterally. A2: unilateral intercalated edentulous (premolar or molar) in the absence of occlusal collapse, diastema, dental migration or passive extrusion of the antagonist elements. A3: unilateral distal molar edentulous. Series B identifies bilateral edentulous conditions and is distinguished by the yellow color. It represents a condition of functional sufficiency hierarchically submitted to series A (Fig.2). The B series is also summarized in three distinct simplified models: B1: edentulous intercalated with signs of occlusal collapse, mono or bilateral, diastemas, migrations of the border elements or passive extrusions of the antagonists. B2: bilateral molar edentulous or “shortened dental arch” (S.D.A.). B3: bilateral distal edentulous with last active functional unit. The C series represents the condition of functional insufficiency, is characterized by the red color and represents the condition of maximum risk of PRS (“Prosthesis Rejection Syndrome”). It too identifies three distinct simplified models, all marked by no functional unit in antagonism (Fig. 3). C1: residual maxillary and / or mandibular dental elements not in antagonism with each other. C2: “Single Denture Syndrome” and related syndromes. C3: total edentulous outcome of one of the previous conditions (C1 and C2). ABC identifies, through the study of these nine models, a general guideline, with immediate visualization of the level of effectiveness and functional efficiency; moreover, it allows to advance a forecast of the evolution of the clinical case, both in anticipation of dental extractions with the resulting downgrading and in the case of fixed implant prosthesis to restore the physiological dental formula, with the advantages we know<sup>7-10</sup>.



**Figure 1.** Series A, green color. Functional excellence. Small intercalated or distal unilateral edentulism. No signs of occlusal collapse. Simultaneous bilateral or alternating unilateral chewing. It requires urgent compensation therapy. Minimal clinical difficulty even for inexperienced operators.



**Figure 2.** Series B, yellow color. Functional Sufficiency. Long-standing intercalated or distal mono or bilateral edentulism attributable to occlusal collapse outcomes. Ipsilateral chewing. Medium prosthetic difficulty.



**Figure 3.** Series C, red color. Functional deficit. No intermaxillary relationship preserved. Non-acceptance syndrome of removable prosthesis for the patient who has never been a prosthesis wearer. The dentate patient with complete loss of occlusal anatomy should also be considered as series C (e.g. extreme bruxist). Maximum difficulty even for experienced operators.

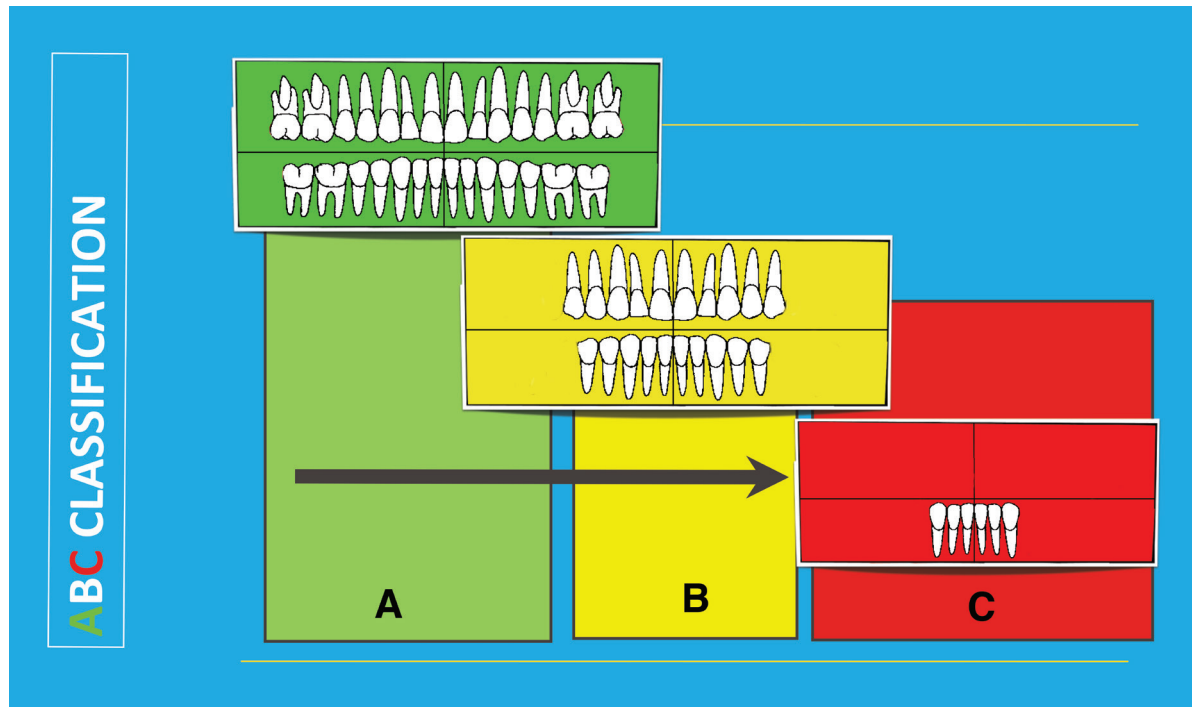
## Discussion

The ABC classification allows to perform some clinical considerations of general value such as: a rapid diagnostic semiotic analysis of the oral cavity of a partially edentulous patient; an intuitive biomechanical reasoning on the patient's preferred chewing side, by looking for signs of parafunction; educates the clinician to read the clinical and radiographic changes of a patient who has undergone tooth extractions not compensated by prosthetic replacements in accordance with the models reported in literature, allowing to advance prognostic hypotheses for the prediction of medium-long term complications; offers a clear, simple and effective communication tool with the patient; analyzes the anatomy according to guidelines common to all operators in the sector (dentists, dental hygienists, dental technicians) and validates some psychosocial aspects of chronic edentulism; proposes a census of the classic syndromes of edentulism and an immediate differential analysis relating to the most common complications reported in the literature; it allows an immediate data collection, suitable for a first visit screening and catalogable in any clinical record using a dental alert formula about the difficulties of accepting conventional prostheses. The moment of incorporation of a removable prosthesis is the result of a complex combination of factors and recognizes subjective, objective and psychosocial aspects<sup>11-13</sup>. The literature has analyzed this complexity in detail and all dentists have experienced the frustration of some cases in which high levels of satisfaction are not achieved despite the procedures being consistent with the state of the art, while in other cases mobile prostheses highly incongruous for the dentist are considered excellent by patients<sup>11-13</sup>. These are obviously problems of poor acceptance of the restoration in the first case and over-acceptance in the second. The phenomenon has been widely described and recognizes a psychosocial origin. The clinician must therefore be able to read the patient from an anatomical but also a psychological point of view, and must have a clear picture of the predisposing, favoring and triggering conditions of prosthetic rejection<sup>11,14,15</sup>. This diagnostic sensitivity, which recognizes in clinical experience some antidotes to prosthetic refusal, it can be supported in terms of communication with the edentulous patient by a few rules proposed by the ABC classification. It is clear, a fact widely reported in the literature, that implant-supported prosthesis can represent a valid therapy for this "inability to adapt to the prosthesis". The study of some peculiar models of edentulism (the so-called partial edentulous syndromes described in the early decades of the 1900s) seems particularly indicative in identifying subjects at risk of dissatisfaction or prosthetic rejection<sup>7-10</sup>. The explanations of this phenomenon are not completely known, but it is evident that removable prostheses have non-negotiable limits, which makes them particularly disadvantageous in some categories of patients compared to fixed prostheses<sup>16-20</sup>. In our clinical experience, some anatomical and clinical conditions such as "Kelly's Syndrome", the "Single Denture Syndrome", "Combination-like Syndromes", the "Eagle's Syndrome" or the "Ernest's

Syndrome" seem to have a value predictive of the phenomenon. Furthermore, these cases have some peculiarities: when treated with fixed implant prostheses, such as conventional Implant Bridge or Toronto Bridge, they concentrate most of the technical complications in the short-medium term, highlighted as fractures or detachment of replacement teeth, chipping or loosening of the screws<sup>8-10</sup>. In these cases it seems prudent to adopt some precautions, such as adequate provisional times and the promotion of a rehabilitation process that includes personalized oral psychiatry instructions, to be continued even after the delivery of the definitive prostheses<sup>21-23</sup>. It is therefore clear that the dentist's work in prosthetic rehabilitation should not be limited to measurement mathematics of bone volumes, to the positioning of dental implants or to the delivery of the prosthetic restoration in the hope that the patient gets used to it by himself. An additional effort is needed for the recovery of neuromuscular coordination and self-image that neuroscience has described as "overcoming of acquired paralysis"<sup>24</sup>. In all this reasoning, the operator is required to have a cultural background in the neurological, physiological and psychiatric fields which seems to push prosthetic dentistry towards oral medicine.

## Conclusions

The ABC classification represents a rapid pre-diagnostic tool capable of identifying 3 levels of difficulty of the clinical case: progressively, proceeding from green to red, the clinician can ideally foresee the series of pre-treatments and the level of difficulty in prosthetic acceptance of every single individual (Fig. 4). The classification system represents a didactic screening tool without epidemiological purposes. It also constitutes an alert approach on some frequently observed clinical scenarios, potentially insidious in prognostic terms. It represents an invitation to the analysis and census of some classic syndromes of partial edentulism and offers some prognostic and biomechanical insights that can be useful to all categories related to dentistry, from dental hygienist to dental technician. The concept of dynamic edentulism and the medium-long term tendency to concentrate the worsening of the clinical conditions of the oral cavity on the non-working side of the patient, invites the clinician to re-evaluate the concept of prevention of occlusal collapse. The dental extractions of the posterior sectors not compensated by the replacement of the lost elements are the real key factor of the reasoning proposed by the ABC classification. The techniques to compensate for edentulism can be different, from orthodontics to fixed prostheses to implantology, and the differential diagnosis is left to the clinician's decision. Fixed prosthetic therapy for edentulous gaps, performed according to the state of the art, is the most effective prevention tool we have. The ABC classification has proved to be a tool simple but effective work in communication with patient and in the pre-diagnosis of partial edentulism in a particular context of social dentistry that it has followed by the 2012 Emilia Romagna earthquake.



**Figure 4.** Chronology of the progression of partial edentulism not prosthetically compensated. From left to right, excellence, sufficiency and functional deficits. Implantology represents the tool to be able to reverse the direction of the arrow, offering the operator the possibility of deciding at which functional level to rehabilitate the patient.

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