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ORIGINAL ARTICLE

Classification of Patients by Occlusal Condition

Mikaele Garcia de Medeiros[1], Eduardo José Guerra Seabra[1], Marquiony Marques dos Santos[1], Juliana Carvalho Sá[1], Ana Clara Soares Paiva Torres[1]

[1]Department of Dentistry, School of Dentistry, State University of Rio Grande do Norte, Caicó, RN, Brazil.

Correspondence: Mikaele Garcia de Medeiros, Ministro Joaquim Pedro Villaça Street, 166 A, Residential neighborhood, Caicó, RN, Brazil. 59300-000. **E-mail:** mikaelemika@msn.com

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ABSTRACT

Objective: To propose a classification of patients by occlusal condition and its apparent validation. **Material and Methods:** This cross-sectional analytical study was divided into two phases. In the first, a trained examiner divided the patients into four groups according to the proposed classification of this design: Type 1 patient – completely dentate individuals; Type 2 - partially edentulous individuals with occlusal stability; Type 3 - partially edentulous individuals with no occlusal stability; Type 4 – completely edentulous individuals. In this phase, 122 patients were analyzed with an instrument developed for this experiment. **Results:** All patients in the sample of this research were classified in some division of the proposed instrument. In the second phase, the apparent validation of the classification was conducted by three judges, who obtained an excellent agreement with the allocation of patients in one of the types according to the indication of the first examiner (Kappa = 85%). **Conclusion:** It is evident that the classification presents reliability, ease of visualization, good conditions for interprofessional communication, and it can be used in dental clinical practice to assist in the study and integrated planning of clinical cases.

Keywords: Orthodontics; Dental Occlusion; Jaw, Edentulous, Partially; Oral Health.

Introduction

Historically, the difficulty of communication between dental professionals and laboratories has led to creating some classifications such as those proposed by Kennedy, Cummer, Bailyn, Wilson, Applegate, among others. These authors classified the partially edentulous arches according to their topography and/or other characteristics. Among these classifications, the most used one is Kennedy, probably for being the simplest and best known [1,2].

Other classifications were also made regarding the most diverse areas of Dentistry. As the classification of artificial cavities suggested by Black [3], which combined them into five classes that required the same instrumentation and restoration technique; the classification system that organizes malocclusions into three major groups, developed by Angle, which is the best known and currently used, certainly due to its simplicity of understanding and its comprehensiveness [4]; and the classification of the physical condition of adult patients by the American Association of Anesthesiologists (ASA), in which patients were divided into six categories closely related to anesthetic morbidity and mortality [5].

These classifications, like many others, were created to improve communication and scientific exchange between professionals and assist in teaching, besides facilitating the study, planning, and treatment of cases. Such classifications, therefore, can improve the teaching and learning processes in Dentistry courses, whose primary objective is to train a general practitioner capable of diagnosing, planning, executing, and comprehensively evaluating dental problems, promoting a new perception for students and dental professionals concerning the real demands of the population [6].

Based on this framework, the objective of this research was to propose and evaluate whether the classification made by the authors, grouping patients into four types according to their occlusal condition, can be verified in the population. This can be useful for interprofessional communication and the study and teaching on diagnosis and integrated treatment plans to better understand the need and complexity of oral rehabilitation.

Material and Methods

Ethical Considerations

This research was submitted and approved by the Research Ethics Committee of the Universidade do Estado do Rio Grande do Norte (CEP-UERN) under Protocol number 3.147.201. The patients in the present study were evaluated upon agreeing and signing the Informed Consent Form.

Proposed Classification

The present classification, called "SEABRA-MEDEIROS" for now, was based on the occlusal condition found in patients at dental clinics at the State University of Rio Grande do Norte. This classification groups patients into four classes according to their occlusal condition, as shown in the image below (Figure 1).

Type 1 patients are those completely dentate, having, from the biological point of view, greater harmony between the components of the stomatognathic system, with occlusal stability and mutually protected occlusion. It is worth noting that in situations where patients have a complete dentition up to the first molar (without the need for posterior tooth replacement), they fall under this classification. Patients in this group have a lower degree of complexity and minimal complications in formulating and executing their treatment plan.

Type 2 patients are partially edentulous with occlusal stability. Therefore, the intermaxillary record can be done in maximum habitual intercuspation or centric relation; this patient has a more complex treatment plan than the previous one, but still with favorable conditions.

Type 3 patients, partially edentulous with no occlusal stability. These are the most complex ones, requiring more clinical time for the preparation of their treatment plan as well as for its execution. Adjustments of the orientation planes with metric corrections in the vertical dimension are already necessary for the examination phase. In this type of patient, free working space will be necessary and the occlusal registration must be done in centric relation.

And there are the Type 4 patients, completely edentulous. Their clinical protocols are already well understood and the level of complexity in planning for this type of patient is inferior to types 2 and 3.

In brief, there are:

- Type 1 patients: completely dentate individuals;
- Type 2 patients: partially edentulous individuals with occlusal stability (vertical dimension maintained);
- Type 3 patients: partially edentulous individuals with no occlusal stability (alteration of the vertical dimension);
- Type 4 patients: completely edentulous individuals.

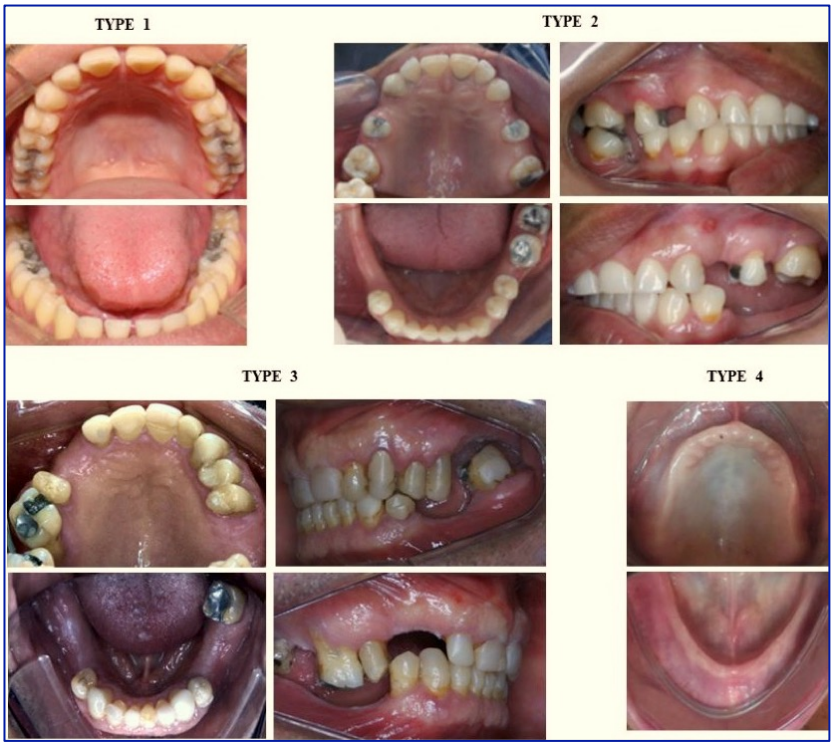

Figure 1. Classification of patients by occlusal condition.

After proposing this classification, a cross-sectional and analytical study began, developed in two phases: the first was the use of the proposed classification as a research tool for data collection to identify the the profile of patients attending dental clinics at UERN. An intra- and inter-examiner training exercise to certify and ensure uniform interpretation and understanding of the conditions that were observed and recorded was conducted by the research coordinator to collect data for the first phase. A total of 10 patients were

examined. Adopting a 95% confidence level and a sampling error of 5%, the Kappa inter-rater agreement index was 1.00, which is considered an excellent level. In the second phase, the apparent validation was performed through the evaluation of the instrument, which is the SEABRA-MEDEIROS classification, by judges. In addition, three students from the 10th semester of the dentistry course at the university were randomly selected to collaborate in the apparent validation.

Studied Population and Location

The research was conducted in the dental clinics of the State University of Rio Grande do Norte, Campus Caicó, where patients voluntarily seeking dental care participated, or or those already under care.

Sample

A non-probabilistic convenience sampling was performed, through which patients who were under care during the 6 months of data collection and who agreed to participate in the study were included.

Inclusion and Exclusion Criteria

Individuals of both genders, over 18 years old, under dental care at the dental clinics of the State University of Rio Grande do Norte, Campus Caicó, were included. However, patients who were unable to promote mouth opening for whatever reason and those with fixed prostheses and dental implants were excluded.

Data Collection

Data collection was conducted at the UERN dental clinics from February to July 2019. The evaluations were performed in an individual, comfortable room, guaranteeing secrecy, privacy, and confidentiality of information.

This evaluation consisted of a clinical examination by visual inspection performed by a single examiner with the aid of a tongue depressor (wooden spatula). After evaluation, according to the occlusal condition, data were recorded in a clinical form developed specifically for this research. The sociodemographic information and self-perception of oral health that were raised are inserted in this form (Annex). Initially, the presence or absence of teeth was evaluated. Then, the occlusion was observed. At this time, the presence or absence of centric occlusion, according to the oral characteristics found, was assessed. Afterward, 21 patients were randomly selected so that judges could reassess and qualify them according to the classification proposed by the authors to perform the apparent validation.

Apparent Validation

Three judges participated in the second phase of the research, with technical knowledge on the subject and properly trained by the authors. There was an inter-examiner analysis to see if they agreed with each other, and the Kappa coefficient estimated the levels of agreement.

Data Analysis

The data were tabulated in software Microsoft Excel 2016 (Microsoft Corp., Redmond, Washington, USA) and the analysis was done with the SPSS (Statistical Package for Social Science), version 18.0, for the

descriptive statistical analysis of the general characteristics of the studied population. In addition, Kappa index and a 95% confidence interval were used to verify the reliability of the proposed instrument.

Results

In the first phase of the study, 122 patients from the integrated dental clinics of the UERN participated, the majority (60.66%) being female and with an average age of 40.3 years. Regarding the results of the type of patient according to the proposed classification, 100% fell into some of the Types, with Type 2 (partially edentulous with centric occlusion) being the most prevalent, corresponding to 69 patients (56.56 %) (Figure 2).

Regarding self-perceived oral health according to the type of patient: Type 1 - 60.261% responded that they were satisfied, 24.24% were neither satisfied nor dissatisfied and 15.15% were dissatisfied; Type 2 - 43.48% were satisfied, 23.19% were neither satisfied nor dissatisfied and 33.33% were dissatisfied; Type 3 - 47.06% were satisfied, 23.19% were neither satisfied nor dissatisfied, and 41.18% were dissatisfied; Type 4 - 33.33% were satisfied, and 66.67% were dissatisfied. For race, education, and place of residence, 55.74% were non-white; 45.90% reported having completed secondary education (100% of Type 4 patients reported their education level at elementary school), and 97.54% were residents of the urban area. As for appointments at the dentist, 100% had previously attended the dental clinic.

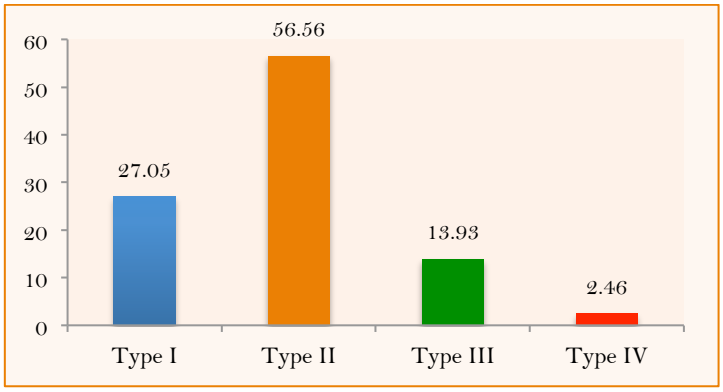

Figure 2. Type of patient according to the proposed classification.

When performing the apparent validation with the three judges, all were able to classify the patients within the types proposed. There was a Kappa degree of agreement of 85%, which is equivalent to an almost perfect agreement between judges. Therefore, the classification was evaluated positively, demonstrating its applicability and reproducibility.

Discussion

Several areas of health use classifications of patients as, for example, the risk classification used in hospitals for screening, so that the identification process is dynamic, preventing complications, providing well-established decision-making that contributes to planning the course of action, establishing the patient profile, and strengthening the communication process of the different care needs [7-9]. In this study, the new classification proposed for patients in the dental field, similar to the one previously mentioned, also aims to optimize communication, planning, and treatment. According to it, for each type of oral condition, there are different levels of difficulty in the composition and execution of the clinical treatment, demanding the obtention of information for different levels of complexity.

Prospective longitudinal studies concluded that the number of teeth is a significant predictor of mortality regardless of health factors, socioeconomic status, and lifestyle [10,11]. In this sense, TYPE 1 patients, completely dentate, have a higher expectation and quality of life than patients of the other types. However, socioeconomic and demographic factors must be carefully considered in the interpretation of these findings since edentulism is known as a condition of the poor and sick, with a low level of education [12]. This was evidenced with this study, in which all Type 4 patients, edentulous, had only elementary education.

Edentulism, whether partial or total, in addition to being considered a general health problem of the individual [13], since tooth loss is related to the deterioration of masticatory efficiency, which can lead patients to malnutrition and to other negative consequences on taste, phonetics, and aesthetic aspects, it is also considered a social problem [14]. Oral rehabilitation is a treatment that requires extensive planning since many cases have the need to interrelate different areas of Dentistry. In this context, it can be inferred that patients of Types 2, 3, and 4 need a more resolutive and urgent treatment plan, which will involve an increasingly higher and gradual level of complexity from idealization to execution.

During this rehabilitation, proportionally to the increase in the degree of complexity, aspects related to the restoration of the occlusion must be observed, including the recovery of the vertical dimension of occlusion (VDO) [15], which is the vertical distance between the mandible and the maxilla when the teeth are occluded [16]. Clinical complications were observed in patients with altered VDO, making oral rehabilitation difficult, and therefore, its progressive restoration is recommended [17]. This makes the treatment of the Type 3 patient, partially edentulous with no centric occlusion, more complex. There are several methods available only for estimating the adequate VDO. However, such methods are empirical, with a lack of universally accepted technical-scientific evidence to accurately determine it. Therefore, it is up to the practitioners to judge and favor a technique. Regardless of the one chosen, they must be aware of its limitations, and the combination of one or more methods is recommended [18]. This difficulty can be anticipated and minimized from the moment the dentist understands the patient's profile, according to the classification proposed in this study.

All rehabilitation planning must be built on what is called the “free working space”, justifying the need to use the centric relation (CR) for patients Type 3 and 4. This is necessary since CR is the most retracted physiological position of the mandible in relation to the maxilla, favoring the gain of free working space [19]. Thus, the fact that the patient has or does not have the vertical dimension maintained by centric occlusion is extremely relevant for the complexity of the treatment plan and clinical procedures. For this reason, patients who have dental absences, but with no change in their centric occlusion (Type 2) were grouped separately from the partial edentulous ones with no centric occlusion (Type 3) since the first have satisfactory functional stability and better prognosis. In this way, increasing order of complexity in the diagnosis and planning between groups can be established (Type 1> Type 2> Type 3).

Despite not being the focus of the research, the degree of satisfaction of individuals with their oral condition within the proposed classification deserves to be discussed here. Patient satisfaction declines as the number of teeth in the arch decreases. This indicates the importance that should be given to the oral condition of the population. It is also worth calling attention to the degree of patient dissatisfaction increasing when the path for planning and executing their clinical dental treatment is more extensive, complex and outside primary care in oral health. From the dental point of view, these patients require applications of broader concepts in Oral Rehabilitation. The classification proposed by this study can be applied as a measure for the clinical complexity of rehabilitating dental treatment. For didactic purposes, it can be applied in the organization of the

integrated clinics of Dental Education Institutions and in directing patients to students according to their levels of complexity.

In cases of greater complexity, the SEABRA-MEDEIROS classification will help provide a better view of the level of difficulty [20] of the case. So that, even in Type 3 patients, for example, treatment planning can be optimized, becoming less expensive and more effective.

In the judges' analysis, the use of the Kappa index is justified as it is the means of assessment and total agreement for examiners. Kappa indices of agreement between 60% and 79% are considered substantial [21]. For this reason, it was used as a criterion for the pertinence of the classification. As the judges agreed on very satisfactory levels, evidence regarding the validity of the instrument was indicated.

The limitations of the present study include the fact that data collection took place in a short period and depended on the number of patients cared for students at the UERN dental clinics and the fact that dentists were not included in the retest. Therefore, it is desirable to validate this instrument in samples from other institutions to perfect it.

Conclusion

All patients examined were included in the SEABRA-MEDEIROS classification. The classification presents applicability, reproducibility, reliability, and ease of visualization. It also provides good conditions for interprofessional communication, and it can be used in dental clinical practice to assist in the study and integrated planning of clinical cases.

Authors' Contributions

MGM	https://orcid.org/0000-0002-5307-9782	Formal Analysis, Investigation, Writing - Original Draft and Writing - Review and Editing.
EJGS	https://orcid.org/0000-0003-3166-6553	Conceptualization, Methodology, Writing - Original Draft and Writing - Review and Editing.
MMS	https://orcid.org/0000-0001-5812-4004	Data Curation and Writing - Review and Editing.
JCS	https://orcid.org/0000-0001-5060-0205	Writing - Review and Editing.
ACSPT	https://orcid.org/0000-0002-7525-3171	Writing - Review and Editing.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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