

## MALPRACTICE IN COMPOSITE/MIXED PROSTHESIS

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### ABSTRACT

The purpose of this study is to indicate the causes of malpractice in composite/mixed prosthetics, by quantifying the main factors related to the particularity of the prosthetic field, to the choice of composite prostheses design, to the choice and application of maintenance, support and stabilization elements in agreement with the treatment principles: prophylactic, biomechanical and biological. The study was based on a number of 170 patients who reported to the Clinical Education Facility of the Faculty of Dental Medicine with various types of prostheses in the field of mixed/composite prosthetics. With regard to the factors favoring malpractice, we noticed a number of 20 cases in which partial rehabilitation was made while preserving the old restorations. A number of 40 cases belonged to an inconsistency between the clinical-biological indicators and the prosthetic solution of choice, 30 cases of malpractice due to failure to observe the biomechanical principle and 10 cases were due to the absence of morphofunctional harmony between the fixed and removable prostheses, out of the total cases under evaluation. Unwanted aspect of these prostheses is malpractice, which may occur if certain crucial elements related to the prosthetic field are not observed, if certain procedures in the field of non-specific prosthetic therapy are not followed and if the design and biomechanical principle are not complied with. The modern methods of complex oral rehabilitation are mainly indicated by taking into consideration the objectives of the treatment plan in view of restoring the biomechanical balance and the functions of the stomatognathic system. Failure to correlate these methods with the status of the prosthetic field may lead to malpractice.

**Keywords:** malpractice, removable prosthesis, attachment, oral rehabilitation

### INTRODUCTION

Composite prosthetics is an elegant and efficient alternative of removable prosthesis, the influences of dento-somato-facial esthetics in the context of progress made in the last decades, corroborated with the patients' exigencies, conferring another approach of this aspect of prosthetic therapy [1,2].

The variety of clinical cases the dentist is

confronted with is an extremely important element, a challenge in choosing the particularities of elaboration of composite prosthetic constructions, taking into consideration the extremely large offer of maintenance, support and stabilization systems. The complexity of the composite therapy undoubtedly resides in the interdisciplinary aspects implied by the elaboration algorithm of these prosthetic

constructions [3,4].

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**PURPOSE**

The purpose of this study is to indicate the causes of malpractice in composite/mixed prosthetics, by quantifying the main factors related to the particularity of the prosthetic field, to the choice of composite prostheses design, to the choice and application of maintenance, support and stabilization elements in agreement with the treatment principles: prophylactic, biomechanical and biological.

**MATERIAL AND METHODS**

The study was based on a number of 170 patients who reported to the Clinical Education Facility of the Faculty of Dental Medicine with various types of prostheses in the field of mixed/composite prosthetics.

The working procedure aimed at the clinical and paraclinical evaluation of these patients, with the identification of the malpractice cases and the determination of the factors which led to this clinical outcome, factors related to the particularity of the clinical case, the therapeutic concept or the failure to comply with certain stages in the treatment algorithm.

**RESULTS**

The study lot comprised a number of 170 individuals, 57.1% female and 42.9% male, aged between 35 and 75 in case of women and between 42 and 70 in case of men (Figure 1).

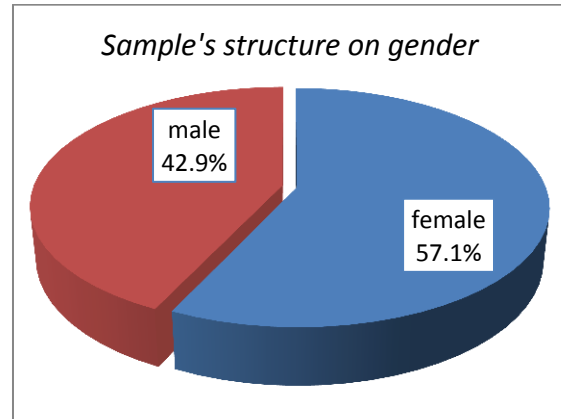


Figure 1.

With regard to the edentation classes, we noticed a prevalence of Class I Kennedy – 48 cases, followed by Class II Kennedy- 38 cases, a number of 30 cases belonging to Class III Kennedy, 25 patients for Class IV Kennedy, while for subtotal edentation – Class V Kennedy there were 12 cases and for Class VI Kennedy a number of 17 cases.

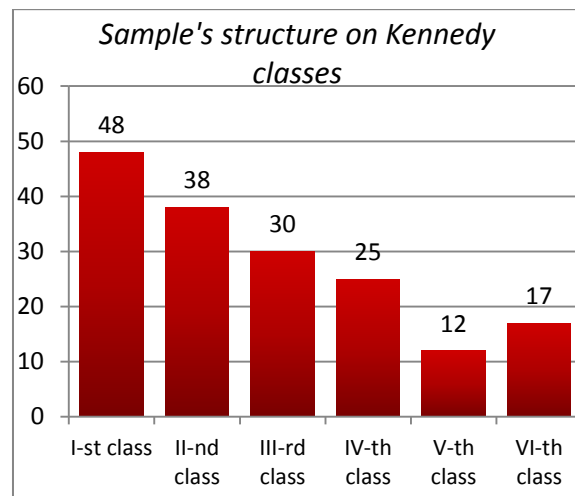


Figure 2.

With regard to the edentation classes whose therapy was under the incidence of malpractice, one can notice 25 cases of malpractice out of 48 cases for Class I Kennedy; within the therapy by mixed or composite prostheses, for Class II Kennedy, out off 38 cases under evaluation, 20 belonged to the malpractice incidence. Out of the 30 Class III Kennedy edentation, 15 cases

showed malpractice, for Class IV Kennedy out of 25 cases under evaluation 15 included malpractice and in case of subtotal edentation we identified a number of 10 malpractice cases out of the 12 evaluated for Class V Kennedy and 15 malpractice cases of the 17 Class VI Kennedy, respectively (Figure 3).

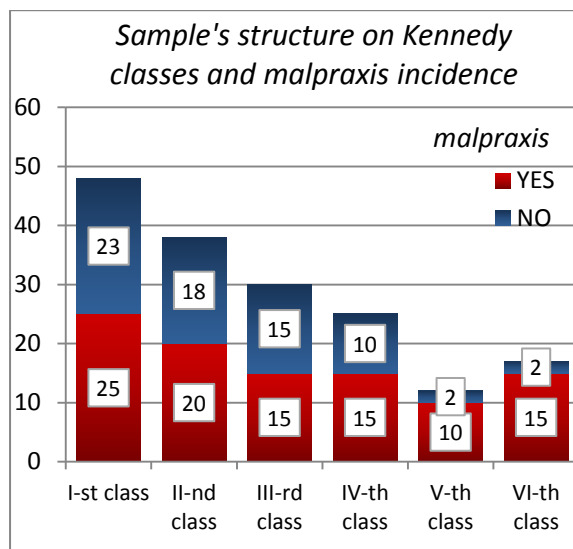


Figure 3.

With regard to the factors favoring malpractice, we noticed a number of 20 cases in which partial rehabilitation was made while preserving the old restorations. A number of 40 cases belonged to an inconsistency between the clinical-biological indicators and the prosthetic solution of choice, 30 cases of malpractice due to failure to observe the biomechanical principle and 10 cases were due to the absence of morphofunctional harmony between the fixed and removable prostheses, out of the total cases under evaluation (Figure 4).

A number of 60 mixed prostheses and a number of 40 hybrid prostheses were represented, in which the use of glides without anti-tilting arm was found in a number of 20 cases, the improper use of staples as maintenance, support and stabilization elements was present in 10 cases and the improper use of bars was present in a

number of 10 cases (Figure 5).

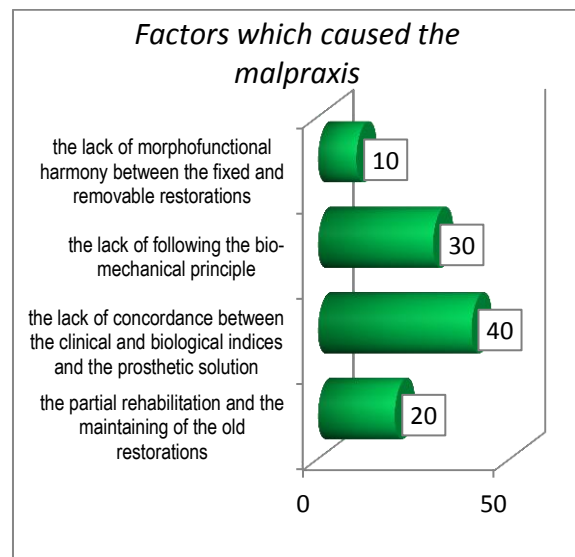


Figure 4.

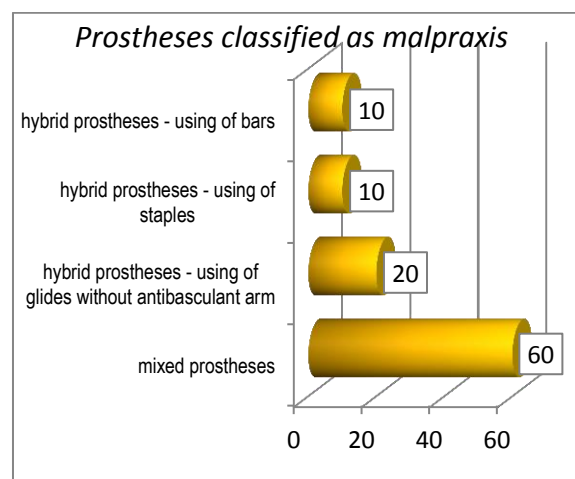


Figure 5.

## DISCUSSIONS

Following the correlative statistic analysis, we can synthesize the following factors which may lead the mixed or composite therapeutic solution to either malpractice or an acceptable solution:

1. Topography of edentation. Thus, depending on the arch which needs removable (mixed or composite) prosthesis, in agreement with the edentation type, the relationships between them shall be taken into consideration, including the following: the occlusion relationship between remaining

teeth, the available space required for artificial teeth, arch integrity, teeth morphology. In case one of these parameters is not observed, the therapeutic solution of choice is anchored in the malpractice register.

2. The answer of oral tissues to previous stress, the state of the periodontal of remaining teeth, their number. In case of clinical cases where no attention is paid to these essential aspects, the clinical finality is in the field of malpractice, with serious consequences on the homeostasis of the stomatognathic system.

3. In clinical situations, frequent in the dental medical practice, in which the removable prosthesis shows one or two terminal saddles, the following aspects shall be considered:

- Realization of indirect retention;
- The design of brackets used to minimize the forces applied on the support tooth following functionalization;
- The need of a future basis, which will influence the type of the material
- The technique of functional impression to be used
- The need to cover the crowns of remaining teeth by covering crowns,

influencing the type of the cast bracket, with a specific design;

- The type of main connector indicated
- The materials used both for the metallic skeleton and for the prosthesis base;
- The patient's experience with removable prostheses, as well as the reason the patient invokes for the realization of the new prostheses; the patients' expectations; if, for instance, the patient requires a lingual bar prosthesis, was it due to the design or the patient's inability to adapt? Frequently, in the evaluation of these factors, a dento-lingual plate is preferred. If the anterior palatine bar was blamed, was it due to the volume, location, flexibility or tissue irritation? The use of posterior small-width palatine plate may be preferred to the anterior bar or main U shape maxillary connector with posterior opening.
- The method used for the reconstruction of a single anterior or posterior tooth. The decision of using fixed restoration for these spaces rather than through the use of removable prosthesis should be considered during the conception of the treatment plan (Figure 6).



**Figure 6. Clinical situations showing the absence of a single odontal unity which fail to recommend rehabilitation using removable prosthesis**

The decisions taken from the analysis and practical super-opposability of these elements shall influence the design of the metallic

skeleton.

It is obvious that there are 2 distinct types of partially removable prostheses. On the one

hand, we have the prostheses which morphofunctionally reconstruct Class I, II Kennedy edentation and on the other hand we have prostheses used in the Class III edentation. The first consideration is the perspective of the support. In case of Class I, II Kennedy, the prosthesis shall rest only on the tooth that medially limits the edentation, namely on the fibro-mucous membrane of the alveolar ridge, while in Class III, the prosthesis shall rest both medially and distally on the support teeth [5,6].

The method of taking the functional impression is another difference between the two types of prostheses. The third point of view is the necessity of meeting the requirements related to the indirect retention in case distal saddles exist. The fourth element is the manner in which distal saddles often support the necessity of a new basis to compensate for tissue modifications [7,8].

Acrylic resin is usually used to construct the prosthesis basis with terminal saddles. The partially removable prosthesis which solved the intercalated edentation resting on the support teeth fails to require a new basis, except for the cases when the removal of an unaesthetic portion is desired, which may prove uncomfortable due to the diminution of adjacent tissues in contact with the prosthesis.

A resorbed, uniform, irregularity free ridge shall provide a good support of the prosthesis, but a precarious stability. A sharp ridge shall provide a faulty support to the removable prosthesis but also a precarious stability. A high resilience ridge is the cause of the instability of the removable prosthesis, also providing poor stability [9,10].

The movements of the prosthesis base during functionalization create a relationship of correct occlusion and also the angle to which the support tooth is subject to the torque and titling action.

The project of a composite prosthesis should be the product of a logical thinking,

requiring a good clinical and technological training, a perfect knowledge of the clinical situation but also of various maintenance, support and stabilization elements. For each particular case the doctor needs to choose the best clinico-technical solution but, unfortunately, certain compromises related to the physiognomy or periodontal protection are under the incidence of malpractice in the dental medical practice.

The partial rehabilitation of a maxillary with the preservation of a morphologically and functionally inadequate antagonist maxillary is a real compromise which only perpetuates the existing deficiencies (Figure 7).

The disharmony aspects between the two types of prosthesis within mixed prosthetics, most of the times a consequence of construction at different times and using a different functional model, is a frequent cause of malpractice (Figure 8).

Longitudinal studies of patients having skeletal (bracketed) prostheses have shown various rates of therapeutic success, depending on the criteria followed and on the monitoring duration. A survival rate of 73% was reported after 5 years, up to 50% after 10 years.

In Vermeulen's study, any alteration of the prosthesis was considered a failure criterion. This explains the low success rate compared to Bergman et al.'s long term study, which showed a success rate of 65% after 25 years of use of bracketed skeletal prostheses.

For composite prostheses a survival rate of 62% was reported after 8 years, although there were significant differences between the semi-rigid and rigid reconstructions.

A study carried out by Kerschbaum et. al., of a longer duration, showed a higher success rate, of 85% after 9 years.

The occurrence of biological failures needs to be discussed in several ways. The damage made by cavities and periodontal



disease may be ameliorated through an improvement of oral hygiene [11,12].



Figure 7. Clinical malpractice case before and after rehabilitation



Figure 8. Aspects of disharmony of the two components of mixed prosthesis

An important role within the therapeutic algorithm is played by the functional impression, which needs to observe the following two requirements:

- The anatomical form and the relationship between the remaining teeth and the soft adjacent tissues which need to be carefully recorded, so that the removable prosthesis shouldn't exercise non-physiological pressures on these structures. The type of impression material should be easily removed from the retentive areas without final distortions. Recommended elastic materials are: irreversible hydrocolloids (Alginate), Thiocol, silicone materials (condensation or addition) and polyether.
- The form of the support edented ridge, of soft tissues in case of Class I, II Kennedy edentation. The impression will be takes so that the firm portions shall be considered primary tissue stress bearer and the soft tissues shall not be non-physiologically stressed. Only this was can there be a maximum support. The functional impression with a sectioned or cut model may be successfully used to this purpose.

The sum of stresses transferred to the edented alveolar ridge and support teeth depends on:

- The direction and magnitude of the force;
- The length of the terminal saddles (force

arm);

- The quality of the support provided by the alveolar ridge and the remaining teeth, resistance;
- The prosthesis design. The bigger the contact surface between each secondary connector and the support tooth corresponding to the guiding plan, the bigger the horizontal distribution of forces.

Such frequent situations in case of malpractice are due to a failure to observe the pre-prosthetic preparations, the most frequent clinical situation being the presence of bony irregularities occurred after serial dental extractions. They are clinically evidenced as prominent, irritant spikes.

Frequently met aspects in case of malpractice are related to the absence of anti-tilting arm in case of extra-coronary glides or of sagittal staples, an element with biomechanical consequences in time over the components of the prosthetic field, as well as the faulty design of the main connector, which sometimes has the tendency to go along the patient's wish of being as thin as possible (Figure 9). Within the limits of this study, the result suggests that there is a general tendency for patients to prefer thinner models of main connectors. Such customized models might considerably reduce the number of difficult patients who bear prostheses.



Figure 9. Aspects of the absence of the anti-tilting arm in the hybrid prosthesis

The technological problems often occur under the form of fractures of brackets or connectors and under the form of retention loss due to the wear of special maintenance, support and stabilization elements. These failures may be overcome by using special elements which are not based on friction or which allow the replacement of a component to recreate friction. A success rate of 95% was reported in case of using these special maintenance, support and stabilization elements in a 2 year study.

A disadvantage of composite prostheses is their low success rate as compared to other ways of treatment which are not based on friction, such as FR – Chip used in this case, which reduce the paraxial load of the support tooth, a major unsolved problem of composite prostheses [1,2].

The continuous monitoring of bearers of composite prostheses was demonstrated, in the sense of preventing potential causes of failure.

## CONCLUSIONS

1. The rehabilitation of the partially extended edented prosthetic field involves a correction of the negative clinico-biological factors, predominantly in the pre-prosthetic stage the therapeutic possibilities being varied. However, the limits are imposed by the particularities of the prosthetic field, without neglecting the socio-economic criteria. Failure to comply with this aspect, with all its facets, transforms the treatment solution in a case of malpractice.
2. The modern methods of complex oral rehabilitation are mainly indicated by taking into consideration the objectives of the treatment plan in view of restoring the biomechanical balance and the functions of the stomatognathic system. Failure to correlate these methods with the status of the prosthetic field may lead to malpractice.
3. The ensemble of therapeutic measures involved in a correct algorithm of rehabilitation using mixed or composite prosthesis, which all converge to the same purpose, the reception of the gnatoprosthetic therapy – is the key element of any therapeutic act, creating optimum success conditions. All therapeutic measures reviewed facilitate the assimilation of an artificial, non-biological tissue, the dental prosthesis. Failure to observe this stage shows the risk of malpractice.
4. The clinical and paraclinical exam are indispensable for the assessment of the oro-dental health condition. They need to facilitate the determination of a diagnosis and of a global treatment plan. The practitioner modulates and adapts the project and therapeutic choices. Thus, he needs to know in advance whether the periodontal support can receive a prosthesis or a previous reconstruction is needed, thus avoiding the malpractice situations.
5. A good knowledge of the selection criteria for the therapeutic solution ensures the quality of results over time. A well conducted clinical examination, associated with the radiographic one, allows the determination of pre-prosthetic preparations, an essential stage for an optimum finality, the absence of which creates the premises for a therapeutic compromise.



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