

Classification systems for partial edentulism

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Abstract

In the last century partial edentulism was sorted using different criteria mostly topographical. Although advantageous through their simplicity these classifications do not please the clinician because of the small amount of information given to the dentist regarding the oral status of the patient. The American College of Prosthodontists drew up a complex classification system, based on clinical criteria. Because the dental literature over the ocean uses this classification frequently we considered that it must be brought to knowledge in the Black Sea Countries.

Key words: partial edentulism, partially edentulous arches, classification.

The absence of one to 15 teeth on a jaw is called partial edentulism. The treatment of this pathological state is performed by dentists, to be more exact by prosthodontists, usually through traditional solutions (fixed or removable prosthetic constructions) and sometimes with dental implants. To restore the continuity of a dental arch breached by edentulous spaces was a dogma for a long time. In the last decades new concepts arrived, some of the dogmas being questioned. Further more a new attitude of expectancy appeared, consisting of following up the parameters of oral health in a partially edentulous patient. As an example the expectancy attitude is justified by terminal edentulism on both jaws – shortened dental arches. In situations like the one above Witter et al [1] mentioned that:

- the stability of the occlusion is sufficient, without the risk of generating temporo-mandibular disorder;
- chewing efficiency and aesthetics are satisfactory for most patients;

- treatment with removable prosthodontics did not improve the chewing efficiency.

Without neglecting it this attitude must not be generalized though we consider that the majority of partially edentulous patients need prosthodontic treatment.[7,12,13,14]

The classification of partially edentulous patients became a need for enhancing the communication between dentists and for the paperwork required by the diagnosis and treatment plan. Throughout the years a lot of dentists have tried to conceive an ideal classification.[8,9,10,15]

An ideal classification for partially edentulous arches has to include informations regarding all the aspect of the clinical case. Besides the topographical aspects of the edentulous spaces, the classification should offer informations regarding the state of the remaining teeth, antagonist teeth, edentulous ridge and the optimal therapeutic solution.[11,16,18,20,22].

Because of the useless complexity needed for such a classification, practitioners

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established some rules for a clinically acceptable classification:

1. simplicity;
2. acceptability;
3. to create the image of the prosthetic field;
4. to give an idea about what can be done therapeutically;
5. to help in establishing the design of the removable prosthodontics where needed.

In the XX century a lot of authors conceived classifications for partially edentulous arches (table 1 – [17,19,21, 22, 23,25,27]). The primary criteria used to render the cases was topographic. Celebrities of the dental world had sorted out this problem: Cummer, Kennedy, Wild, Eichner, Applegate, Erich Körber, Karlheinz Körber. Among these a romanian author appears, Prof. dr. E. Costa [2], who's classification, modified later by Prof. dr. S. Ioni?? [3], is still in use in Romania.

The simplicity of topographical classifications is standing in the shadow created by the low amount of information that such a classification gives to the practitioner.[24,26,28]. We cannot know the situation of the neighbouring teeth or the morphology of the residual ridge. Related to the residual ridge, Siebert [4] tried to render the types of residual ridges. Class I Siebert means residual ridge with tissue loss in width, but integral in height; class II Siebert represents residual ridges with loss in height but integral in width; class III Siebert includes residual ridges with loss both in height and width. This classification can be completed with a IVth class for edentulous ridges with no bone loss.

Another big problem in extended partial edentulism is the anatomy of the edentulous ridge (frenum, muscular insertions). This represents a problem because it is very important in removable prosthodontics to know how easy or difficult the treatment will be. That is why it is necessary to render the clinical situation and the prosthetic field

because the same topographical situation in different patients represents a different clinical situation with different treatment.

So, day by day, a classification needs to contain as many information as possible. Where will this go?

The current trend requires from the classification to give the practitioner the therapeutic solution.[29,30,31].

Seeing this desire to contain as many informations as possible into a classification system, 10 years ago the American College of Prosthodontist (ACP) conceived a classification based on clinical criteria for complete edentulous patients [5]. In 2002 ACP published a classification for partial edentulism [6].

This classification is based on 4 criteria, each one with 4 classes, class 1 represents a simple clinical situation and class 4 a difficult one (table 2).

The criteria are:

1. location and extent of the edentulous space;
2. status of the abutment teeth;
3. occlusal plane;
4. state of the edentulous ridge.

For each of the above criteria there are 4 classes:

Class 1 – ideal or minimally modified situation;

Class 2 – medium alteration;

Class 3 – advanced alteration,

Class 4 – severe alteration.

Criteria 1 – Location and extent of the edentulous space

Class 1 – Edentulous space situated on a single arch:

- maxillary frontal edentulous space no bigger than 2 incisives;
- mandibular frontal edentulous space no bigger than 4 incisives;
- any lateral breach no bigger than 2 bicuspids or a bicuspid or a molar.

Class 2 – Edentulous spaces on both upper and lower jaw:

Table 1

No.	Year	Author's name	Classification criteria
1	1921	Cummer	Topographic, therapeutical
2	1923	Kennedy	Topographic
3	1927	Rumpel	Topographic
4	1928	Bailyn	Topographic
5	1935	Beckett-Wilson	Topographic, biological
6	1935	Balters	Denture support
7	1937	Müller	Topographic
8	1937	Hisekorn	Topographic
9	1937	Hildebrand	Denture support
10	1939	Neurhor	Topographic
11	1939	Dubeq si Delmas-Marsalet	Therapeutic
12	1939	Martin	Topographic, biological
13	1940	Swenson-Terkla	Topographic
14	1942	Mauk	Therapeutic
15	1946	L'Hirodelle	Topographic
16	1949	Wild	Topographic
17	1951	Godfrey	Number of lost teeth
18	1954	Betelman	Topographic
19	1954	Friedman	Topographic
20	1955	Eichner	Number of occlusal contacts
21	1957	Austin-Lidge	Topographic
22	1958	Applegate	Topographic, therapeutic
23	1959	Skinner	Topographic
24	1960	Volldrich	Topographic, biological
25	1961	Osborne	Therapeutic
26	1962	Scoala germana	Topographic
27	1964	Friedman	Functional
28	1966	Avant	Topographic
29	1967	Eichner	Occlusal contacts present
30	1969	Erich Körber	Biofiziological
31	1973	Stefel	Biological, therapeutic
32	1973	Hoffman	Abutments position
33	1975	Miller	Topographic
34	1975	Kerlheinze Körber	Biofiziological, therapeutic
35	1975	Kerschbaum	Sprijinul protezei
36	1975	Costa	Topografic
37	1978	Dumitrescu	Nr. dintilor absenti
38	1978	Martin	Topografic, terapeutic
39	1979	Kobes	Topografic
40	1981	Fabian	Number and position of abutments
41	2002	American College of Prosthodontists	Clinical situation

Table 2

	Class 1	Class 2	Class 3	Class 4
Location and extent of the edentulous space				
On a single dental arch	X			
On both dental arches		X		
Extended edentulous space (more than 3 teeth missing)			X	
Guarded prognosis				X
Maxillo-facial defects				X
Abutments condition				
Ideal or minimally compromised	X			
Moderately compromised		X		
Substantially compromised			X	
Severely compromised				X
Occlusion				
Ideal or slightly affected	X			
Moderately compromised		X		
Substantially compromised			X	
Severely compromised – changes in vertical dimension				X
Residual ridge				
Class 1	X			
Class 2		X		
Class 3			X	
Class 4				X
Situations with guarded prognosis				
Oral manifestations of general diseases				X
Maxillo-mandibular dyskinesia and/or ataxia				X
Refractory patient				X

- maxillary frontal edentulism no bigger than 2 incisives;
- mandibular frontal edentulous space no bigger than 4 incisives;
- any lateral breach no bigger than 2 bicuspids or a bicuspid or a molar;
- missing maxillary or mandibular cuspid.

Class 3 – Any lateral maxillary or mandibular edentulous space bigger than 3 teeth or 2 molars;

Any edentulous space bigger than 3 teeth which crosses over frontal to lateral.

Class 4 – Partial edentulism on patients with low compliance.

Criteria 2 – Status of the abutment teeth

Class 1 – No preprosthetic treatment required.

Class 2

- Insufficient hard tissue for tooth structure to retain or support intracoronal or extracoronal restorations in one or two sextants (considering that an arch has three sextants: lateral left, frontal and lateral right);
- Some of the remaining teeth require adjunctive prosthetic, periodontal, endodontic or orthodontic treatment in one or 2 sextants.

Class 3

- Insufficient hard tissue for tooth structure to retain or support intracoronal or extracoronal restorations in three sextants.

- Some of the remaining teeth require adjunctive prosthetic, periodontal, endodontic or orthodontic treatment in 3 sextants.

Class 4 – Abutment are severely compromised.

Criteria 3 – Occlusion

Class 1

- No preprosthetic therapy required;
- Class I Angle molar and jaw relationship are present.

Class 2 – Occlusion requires localized adjunctive therapy (eg, enameloplasty on premature occlusal contacts);

- Class I Angle molar and jaw relationship are present.

Class 3 – Entire occlusion must be reestablished, but without any change in the occlusal vertical dimension.

Class II molar and jaw relationships are seen.

Class 4 – Entire occlusion must be reestablished, including changes in the occlusal vertical dimension.

Class II division 2 and Class III molar and jaw relationships are seen.

Criteria 4 – Residual ridge

Class 1 – Mandibular height >21 mm in the less higher area.

- Anterior labial and posterior buccal vestibular depth that resists vertical and horizontal movement of the denture base.

Palatal morphology resists vertical and horizontal movement of the denture base.

Class 2 – Mandibular height 10-20 mm in the less higher area.

- Anterior labial buccal and vestibular

depth that resists vertical and horizontal movement of the denture base.

- Palatal morphology resists vertical and horizontal movement of the denture base.

Class 3 – Mandibular height 11-15 mm in the less higher area.

- Loss of anterior labial vestibule.
- Palatal vault morphology offers minimal resistance to vertical and horizontal movement of the denture base.

Class 4 – Mandibular height < 10 mm, in the less higher zone.

- Loss of anterior labial and posterior buccal vestibules.
- Palatal vault morphology does not resist vertical or horizontal movement of the denture base.

ACP elaborated a set of rules for applying this classification.

- The most high-graded criteria establishes the class of the case.
- Extra aesthetic requirements increase the complexity of the class (for class 1 and 2 for every criteria).
- If temporo-mandibular disorder is present this increases the complexity of the class (for class 1 and 2 for every criteria).
- If the maxillary arch is completely edentulous and the mandibular one partially edentulous than each one is considered in its own classification system (for complete and partial edentulism). Complete mandibular edentulism combined with a partial maxillary edentulism or a complete maxillary arch are included in the class 4 because of the complexity of these situations.

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