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Signs of Combination Syndrome and removable partial denture wearing

Sinais da Síndrome da Combinação e o uso de prótese parcial removível

Camila Maria Bastos Machado de RESENDE[a*], Jaiane Augusta Medeiros RIBEIRO[a], Kássia de Carvalho DIAS[b], Adriana da Fonte Porto CARREIRO[a], Michel Platini Pereira do REGO[a], José Werbeson Nogueira de QUEIROZ[a], Gustavo Augusto Seabra BARBOSA[a], Ângelo Giuseppe Roncalli da Costa OLIVEIRA[a]

[a]UFRN – Universidade Federal do Rio Grande do Norte, Natal, RN, Brasil
[b]Faculdade de Odontologia, UNESP – Univ Estadual Paulista, Araraquara, SP, Brasil

Resumo

Introdução: A Síndrome da Combinação (SC) é uma condição patológica associada aos pacientes usuários de prótese total maxilar e prótese parcial removível (PPR) mandibular. **Objetivo:** Observar e mensurar a prevalência dos sinais da Síndrome da Combinação encontrados em pacientes usuários de prótese total maxilar na presença ou ausência de PPR mandibular (Classe I de Kennedy); e averiguar uma possível associação entre a utilização de PPR e a prevalência dos sinais clínicos da síndrome. **Material e método:** A amostra foi composta por 62 pacientes atendidos no Departamento de Odontologia da Universidade Federal do Rio Grande do Norte (UFRN). O exame clínico intrabucal foi realizado para a verificação da presença ou ausência dos sinais clínicos específicos da Síndrome da Combinação, descrita por Kelly (1972): reabsorção óssea na região anterior da maxila, aumento das tuberosidades, hiperplasia papilar palatina, extrusão dos dentes naturais inferiores anteriores e reabsorção óssea posterior mandibular (variáveis dependentes). Para determinação da associação entre as variáveis dependentes e independentes (uso de PPR inferior e tempo de edentulismo superior), foi utilizado o teste qui-quadrado com significância de 95%. **Resultado:** A característica mais frequente foi a presença de reabsorção mandibular (93,5%). Quanto à associação entre o uso de PPR inferior e as características da Síndrome da Combinação, só houve diferença estatisticamente significativa entre portadores e não portadores de PPR com relação à extrusão dos dentes inferiores anteriores (p = 0,045). **Conclusão:** Dentro das limitações deste estudo, verificou-se que os sinais clínicos da Síndrome da Combinação foram bastante prevalentes, e não foi observada associação entre o uso de PPR e as características da Síndrome.

Descritores: Prótese parcial removível; prótese total; reabsorção óssea.

Abstract

Introduction: Combination Syndrome (CS) is a pathological condition observed in maxillary complete denture (CD) and mandibular removable partial denture (RPD) wearers. **Purpose:** The aim of this study was to observe and measure the prevalence of CS signs in treatment-seeking wearers of maxillary CD associated or not with RPD (mandibular Kennedy Class I). The association between RPD wearing and the number of CS clinical signs was also evaluated. **Material and method:** The sample included 62 patients seen at the Department of Dentistry, Federal University of Rio Grande do Norte (UFRN). A clinical oral examination was conducted to assess the presence of specific clinical signs of CS as described by Kelly (1972): bone resorption in the maxillary anterior region, tuberosity overgrowth, palatal papillary hyperplasia, extrusion of mandibular anterior teeth and bone resorption in the mandibular posterior region. The chi-square test at the 95% level of significance was used to test the association between dependent and independent variables. **Result:** Mandibular resorption was the most frequent complication (93.5%). There was a statistically significant difference between RPD wearers and non-wearers with regard to extrusion of mandibular anterior teeth (p = 0.045). **Conclusion:** Within the limitations of the present study, a high prevalence of CS clinical signs was observed, but no association between RPD wearing and syndrome characteristics was found.

Descriptors: Denture, partial, removable; denture, complete; bone resorption.

INTRODUCTION

The Glossary of Prosthodontic Terms[1] defines Combination Syndrome as a set of characteristics that occur when an edentulous maxilla is opposed by mandibular anterior teeth. Kelly,[2] in 1972, introduced the term Combination Syndrome when analyzing six patients wearing a maxillary complete denture occluding with a distal-extension removable partial denture (Kennedy Class I RPD). The characteristic features of this syndrome include: loss of bone from the anterior portion of the maxillary ridge, overgrowth of the tuberosities, papillary hyperplasia of the mucosa of the hard palate, extrusion of mandibular anterior teeth, and loss of alveolar bone and ridge height beneath the removable partial denture bases. Some years later, new features were attributed to Combination Syndrome: loss of vertical dimension of occlusion, occlusal plane discrepancies, spatial repositioning of the mandible in the anterior region, poor denture fit and periodontal alterations[3].

Prevention of degenerative changes caused by complete dentures occluding with bilateral distal-extension removable partial dentures is possible through an appropriate treatment plan and with periodic review of the RPDs and remaining teeth. Treatment alternatives such as preservation of posterior teeth to support mandibular RPDs and use of overlay-type complete dentures provide more adequate occlusal stability and should be considered as treatment options[2].

Although Kelly[2] mentioned the use of an adequate RPD as a way to prevent development of signs of the syndrome, the scientific evidence on this effect is still limited. Salvador et al.[4] studied the presence of Combination Syndrome signs in patients rehabilitated with mandibular RPDs. The authors concluded that patients with Kennedy Class II mandibular RPDs did not show Combination Syndrome, whose prevalence was 25% among the patients attended. The most prevalent CS characteristic was maxillary anterior bone resorption, which was present in 81% of the Kennedy Class I patients and in 75% of the Kennedy Class II patients. Kelsey[5] stated that intolerable forces produced by poorly fitted dentures can cause pressure and inflammation of the supporting tissues, which can make bone loss on the alveolar ridge inevitable. Tolstunov[6] stated that use of poorly fitted dentures for a prolonged period may contribute to mandibular posterior bone resorption. It is essential to identify the initial symptoms of CS and take steps for its immediate correction[6]. Shen, Gongloff[7] found changes in 24% of their patients with natural mandibular anterior teeth and maxillary complete dentures, and found that this rate was not significantly different for patients that did or did not use mandibular removable partial dentures. Faced with these conflicting results, studies are needed that relate the Combination Syndrome signs to RPD wearing, in order to evaluate whether wearing a mandibular denture could minimize the development of syndrome signs. Thus, diagnosis of this condition can facilitate implementation of appropriate clinical conduct and check the destructive process.

The present study's objective was to observe and measure the prevalence of Combination Syndrome or Kelly signs found in patients wearing maxillary complete dentures (CD) with or without mandibular Kennedy Class I removable partial dentures (RPDs) and find out whether there is an association between RPD wearing and the prevalence of clinical signs of the syndrome.

MATERIAL AND METHOD

A cross-sectional study was conducted in the Department of Dentistry, Federal University of Rio Grande do Norte (UFRN), with the approval of the Research Ethics Committee of the institution, under Protocol 409896. The sample was selected from patients with a completely edentulous maxilla wearing maxillary complete dentures (CD) and with a bilateral partially edentulous mandible (Kennedy Class I), wearing or not wearing a mandibular removable partial denture (RPD), who were seeking treatment at the UFRN Prosthodontics Clinic between April and June 2011. Patients wearing mandibular RPDs that were not made with a metal structure and/or patients who showed signs of poor general health were excluded.

Based on the sample selected to evaluate the association between Combination Syndrome signs and mandibular RPD wearing, considering a 95% confidence interval, a power of 80% and an estimated 50% rate of individuals who did not wear dentures (control), the size of the sample is sufficient to indicate a significant difference when the difference is greater or equal to 30%, hence adequate to generate hypotheses.

After signing a free and informed consent form, the individuals participated in an interview on their denture history and time of edentulism. Then they were submitted to a clinical oral examination conducted by two trained researchers who made a joint analysis to determine the presence or absence of the clinical signs specific for Combination Syndrome (CS), as described by Kelly[2]: bone resorption in the maxillary anterior region, tuberosity overgrowth, palatal papillary hyperplasia, extrusion of natural mandibular anterior teeth and mandibular posterior bone resorption (Chart 1). If there was any inconformity with regard to the presence of any of the established criteria, a third examiner, expert in the matter, would resolve it.

The variables were presented in a descriptive manner by means of absolute numbers and proportions. To determine the association between the dependent (clinical signs of CS) and independent (mandibular RPD wearing and time of maxillary edentulism) variables, the chi-square test was used with a significance level of 5%.

RESULT

The sample was composed of 62 patients with a mean age of 58.9 years, a minimum of 39 and a maximum of 78 years, where 21% (n = 13) were men and 79% (n = 49), women. These individuals had maxillary edentulism for a mean period of 28.4 years, with a minimum of 2 years, a maximum of 53 years and a standard deviation of 10.1.

In the sample studied, 53.2% (n = 33) of the patients wore mandibular RPDs. CS clinical features were quite prevalent in

Chart 1. Description of the Clinical Examination

Syndrome Characteristics	Clinical Evaluation
Bone resorption in the maxillary anterior region	Observation of flaccid tissue in the anterior region of the residual ridge susceptible to displacement
Tuberosity overgrowth	Vertical and/or horizontal growth of fibrous or bone tissue in the right and/or left tuberosity region
Palatal papillary hyperplasia	Observation of erythematous mucosa with a papillary surface in the hard palate
Extrusion of the remaining natural mandibular teeth	Observation of dental wear at the enamel or dentin level
Mandibular posterior bone resorption	Observation of accentuated bone resorption in the posterior edentulous region

the sample, except for palatal papillary hyperplasia, which was present in only 16.1% (n = 10; Table 1).

The patients were not evaluated with regard to diagnosing CS by counting specific signs to determine whether they had the syndrome or not, but rather with regard to the presence or absence of each sign and the number of signs per individual.

Of the characteristics, the most frequent was the presence of mandibular resorption (93.5%; Table 1) and the most frequent occurrences were the presence of 3 signs (45%) and 4 signs (32%) per individual, representing a total of 77% of the sample, a value that demonstrates the high prevalence of CS clinical features in patients presenting the profile studied (Table 2).

With regard to the association between mandibular RPD wearing and CS features, a statistically significant difference between RPD wearers and non-wearers was observed only with regard to extrusion of mandibular anterior teeth (p = 0.045; Table 3). The mandibular resorption data could not be analyzed by the statistical test (Table 3), since 100% of the patients wearing RPDs showed this characteristic, making it invariable, thus having a cell with zero value, and making it impossible to use the test.

Table 1. Prevalence of signs of Combination Syndrome. Absolute and relative values

Syndrome Sign	Presence		Absence		Total	
	n	%	n	%	n	%
Extrusion	44	71	18	29	62	100
Tuberosity overgrowth	38	61.3	24	38.7	62	100
Mandibular resorption	58	93.5	4	6.5	62	100
Palatal hyperplasia	10	16.1	52	83.9	62	100
Maxillary resorption	46	74.2	16	25.8	62	100

Table 2. Frequency of clinical signs of Combination Syndrome per individual. Absolute and relative values

Combination Syndrome		
No. of signs	n	%
0	1	2
1	3	5
2	7	11
3	28	45
4	20	32
5	3	5
Total	62	100

DISCUSSION

The term syndrome signifies a set of signs and symptoms that are found associated to a known or unknown entity. By this definition, CS would only be diagnosed when all its signs are present. Nevertheless, there is still no clear indication in the dental literature that all its signs must be present for CS to be diagnosed[4]. Consequently, in the present study, the prevalence of CS signs was assessed rather than the diagnosis of CS.

In the present study, 93.5% of the sample showed mandibular posterior bone resorption, the CS clinical sign most prevalent among the dependent variables studied (Table 1). This clinical feature is common among these patients owing to the natural mandibular bone resorption process that occurs primarily in height. Another factor that influences the presence of this clinical feature is the quality of denture fit[5]. The greater the denture misfit, the greater will be the induction of forces on the residual ridge and its resorption. In the sample, 100% of the individuals wearing RPDs showed this characteristic. Tolstunov[6] stated that bone is deposited and resorbed according to the tensions placed upon it. The use of poorly fitted dentures for a prolonged period may contribute to this type of resorption. In the sample studied, the technical quality of the patients' dentures was not assessed, and the fact that the sample was drawn among patients seeking new dentures may have contributed to the high resorption value found for the patients wearing dentures. This result was not very different from that found for the patients who did not wear dentures (86.2%), showing that lack of a denture is also detrimental. The statistical significance with regard to denture wearing and this clinical feature was not evaluated owing to a zero cell in the data distribution (Table 3). Shen, Gongloff[7] observed no difference with regard to manifestation of this characteristic between wearers (56%) and non-wearers (46%) of a bilateral distal-extension mandibular RPD.

Table 3. Prevalence of CS signs and their association with mandibular RPD wearing. Absolute and relative values and statistical significance. Natal, RN, 2011

CS Feature	RPD Wearing						p*
	Wearer		Non-Wearer		Total		
	n	%	n	%	n	%	
Maxillary resorption							
Present	26	78.8	20	69	46	74.2	.378
Absent	7	21.2	9	31	16	25.8	
Dental extrusion							
Present	27	81.8	17	58.6	44	71	.045
Absent	6	18.2	12	41.4	18	29	
Tuberosity overgrowth							
Present	20	60.6	18	62.1	38	61.3	.906
Absent	13	39.4	11	37.9	24	38.7	
Mandibular resorption							
Present	33	100	25	86.2	58	93.5	**
Absent	0	0	4	13.8	4	6.5	
Palatal hyperplasia							
Present	5	15.2	5	17.2	10	16.1	.823
Absent	28	84.8	24	82.8	52	83.9	
Total	33	100	29	100	62	100	

*Chi-square test; **Chi-square test does not apply.

Reduction of mandibular posterior support results in a gradual reduction of occlusal load in this region and a consequent increase in load in the anterior region, which can result in excessive pressure on the anterior portion of the maxilla, accelerating the process of maxillary anterior bone resorption and promoting the appearance of loose hyperplastic tissue[3]. This provides an explanation for the research findings that show a high prevalence of 74.2% (n = 46) of maxillary anterior resorption (Table 1). This high prevalence is in accordance with the findings of Kelly,[2] but disagrees with this author when he identifies this characteristic as being the most prevalent[3]. No statistically significant difference between wearers and non-wearers was observed with regard to this syndrome manifestation. This may occur owing to the absence of posterior support among the patients who had no mandibular arch rehabilitation or had unsatisfactory rehabilitation, generating similar problems in the anterior region.

An overgrowth of tuberosities was present in 61.3% of the sample, representing 60.6% of the patients wearing an RPD and 60.6% of those who did not (Table 1 and 3). There was no association between the presence of this characteristic and mandibular RPD wearing, as can be seen from the quite similar values. This similarity may have occurred because poorly fitted mandibular dentures may have a biomechanical behavior compatible with denture absence. Shen, Gongloff[7] found a similar prevalence (56%) when they evaluated patients with bilateral distally edentulous mandibular arches wearing a maxillary CD and a mandibular RPD, but found a lower value (22%) for patients who did not use an RPD. The difference between the results of the present study and those found by Shen, Gongloff[7] may be justified by the relatively small sample of mandibular RPD wearers and non-wearers of the latter study (n = 25).

The sign least frequently found in the present study was palatal papillary hyperplasia (16.1%), an inflammatory change caused by wearing poorly fitted dentures, often combined with poor hygiene and some other predisposing factors. In epidemiological studies conducted on mucosa changes, primarily among denture users, the prevalence of hard palate papillary hyperplasia is low[8,9]. Xie et al.[9] found values that ranged from 5% to 10%. MacEntee et al.[8] found hyperplasia in 8% of 155 denture wearers. Coelho et al.[10] observed inflammatory fibrous hyperplasia in 16.7% of the sample in a prevalence study with 334 individuals. Another study, conducted in Turkey in 2009, consisting of 170 complete denture wearers, showed that the incidence of papillary hyperplasia increased with time of denture wearing: 13.3 % from 0 to 10 years of denture wearing and 86.7% for more than 10 years[11].

The literature points to specific clinical data that define CS, but there is no evidence that an individual must show the five clinical signs simultaneously to be considered as having the Combination Syndrome. In this study, it was found that 77%

(n = 48) of the patients showed 3 to 4 clinical signs characteristic of CS. Shen, Gongloff[7] evaluated the presence of some clinical CS signs defined by Kelly[2] in 1972 and others added by Saunders.[3] Considering only Kelly's CS signs, a greater prevalence of 3 signs was found in patients with a maxillary CD and the presence or absence of a bilateral distal-extension RPD. The high number of signs per individual in our study also may be justified by the long period of edentulism of the sample and the consequent greater establishment of degenerative processes resulting from complete maxillary and partial mandibular edentulism without adequate treatment.

In relation to the use of a mandibular removable partial denture, the literature indicates that it prevents the appearance of some signs[3]. The present study found no evidence that RPD wearing provided benefits in preventing CS. The only clinical sign that showed an association with RPD wearing was tooth extrusion. However, the association was related to RPD wearing; in other words, RPD wearers had more extrusion than non-wearers. This result indicates that the dentures probably were unsatisfactory or that the dental arches were not simultaneously rehabilitated, or even that the individuals already showed CS characteristics when first rehabilitated. In a comparative study, Jozefowicz[12] investigated the influence of denture wearing on residual ridge resorption and found that individuals who did not wear dentures had significantly higher residual ridges than those who wore dentures, except for the female group from 60 to 79 years of age. Previously, Cambell[13] found a similar result, but the difference between the wearer and non-wearer groups was not statistically significant, perhaps owing to the small sample used. Alveolar bone resorption is an inevitable process after tooth loss, but it can be minimized with the construction of well-fitted dentures, scheduled follow-up sessions and guidance on denture wearing and care[5]. In 1972, Kelly[2] observed extrusion in 100% (n = 6) of individuals evaluated radiographically after a period of 3 years, which is in accordance with our findings.

As Tolstunov[14] stated, prevention of posterior occlusion loss and anterior hyperfunction are considered the main treatment approaches for CS. The RPD is one of the treatment modalities to correct and treat CS among those available, as long as it is planned to preserve stability, including a maxillary complete denture as antagonist, with a balanced distribution of occlusal tensions and careful maintenance in order to preserve posterior occlusion[6]. For patients who already show CS features, these can be minimized with surgical procedures, special anatomical impression-taking techniques for flaccid tissue, and correct surveying and planning of the rests and clamps of the mandibular RPD infrastructure. Periodic return visits to the dental office to check the need for relining, the integrity of the occlusal contacts, and denture hygiene and fit are also important for these patients. There is also the possibility of treating these patients by placing implants in the mandibular posterior region, eliminating the need for a distal extension, and impeding the vertical and lateral movements responsible for accelerated bone resorption below the RPD resin base[15]. This alternative changes the Kennedy Class I configuration to a Class III one, with a biomechanical advantage, improving masticatory efficiency as well as denture stability and esthetics, depending on the positioning of the implant[16].

Palmqvist et al.[17] observed that, in patients who received mandibular implant-supported fixed dentures, bone resorption in the posterior part of the mandible practically ceased. Consequently, treatment with implants on both arches is a factor to be considered to control bone resorption associated with Combination Syndrome[18].

One of the limitations of this study is the fact that the sample was not probabilistic and representative of the general population. In addition, the fact that the patients were seeking treatment may have made it more likely that they would have CS signs and have been using inadequate dentures. Also, because it was a cross-sectional study, all the measurements were made at the same time, and, therefore, there was no follow-up period for the individuals.

In spite of the limitations, the large number of signs characteristic of the syndrome present in this research is a fact that calls attention to the range of damage already caused, resulting from the lack of follow-up of the dentures installed, insufficient or inadequate treatment, or even the lack of an early diagnosis. This situation will change when the clinician dealing with a susceptible patient is aware of the importance of preventing, diagnosing and intervening early so that damage does not occur, or is minimized.

To evaluate the benefit of RPD wearing in preventing CS signs, controlled and randomized clinical trials evaluating the presence of clinical signs immediately after installation and after prolonged denture-wearing periods are warranted, together with monitoring of the quality of these dentures. Thus, further research should be conducted to assess the association of syndrome features and RPD wearing in longitudinal studies monitoring patients right after they lose their teeth, where the technical quality of the dentures constructed should also be evaluated.

CONCLUSION

It was found that the clinical signs of CS were quite prevalent, except for palatal papillary hyperplasia. The majority of patients showed 3 to 4 signs. The presence of a mandibular RPD with inadequate technical quality or RPD absence were shown to be indifferent with regard to manifestation of clinical CS characteristics, i.e. no association between RPD wearing and CS characteristics was observed.

REFERENCES

1. The glossary of prosthodontic terms. J Prosthet Dent. 2005 July; 94(1): 10-92. http://dx.doi.org/10.1016/j.prosdent.2005.03.013. PMid:16080238
2. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. 1972. J Prosthet Dent. 2003 Sept; 90(3): 213-9. http://dx.doi.org/10.1016/S0022-3913(03)00240-3. PMid:14503534
3. Saunders TR, Gillis RE Jr, Desjardins RP. The maxillary complete denture opposing the mandibular bilateral distal-extension partial denture: treatment considerations. J Prosthet Dent. 1979 Feb; 41(2): 124-8. http://dx.doi.org/10.1016/0022-3913(79)90292-0. PMid:366110
4. Salvador MCG, do Valle AL, Ribeiro MCM, Pereira JR. Assessment of the prevalence index on signs of combination syndrome in patients treated at Bauru School of Dentistry, University of Sao Paulo. J Appl Oral Sci. 2007 Feb; 15(1): 9-13. http://dx.doi.org/10.1590/S1678-77572007000100003. PMid:19089092
5. Kelsey CC. Alveolar bone resorption under complete dentures. J Prosthet Dent. 1971 Feb; 25(2): 152-61. http://dx.doi.org/10.1016/0022-3913(71)90101-6. PMid:4924826
6. Tolstunov L. Combination syndrome: classification and case report. J Oral Implantol. 2007; 33(3): 139-51. http://dx.doi.org/10.1563/1548-1336(2007)33[139:CSCACR]2.0.CO;2. PMid:17674680
7. Shen K, Gongloff RK. Prevalence of the 'combination syndrome' among denture patients. J Prosthet Dent. 1989 Dec; 62(6): 642-4. http://dx.doi.org/10.1016/0022-3913(89)90582-9. PMid:2585321
8. MacEntee MI, Glick N, Stolar E. Age, gender, dentures and oral mucosal disorders. Oral Dis. 1998 Mar; 4(1): 32-6. http://dx.doi.org/10.1111/j.1601-0825.1998.tb00252.x. PMid:9655042
9. Xie Q, Ainamo A, Tilvis R. Association of residual ridge resorption with systemic factors in home-living elderly subjects. Acta Odontol Scand. 1997 Oct; 55(5): 299-305. http://dx.doi.org/10.3109/00016359709114968. PMid:9370028
10. Coelho CM, Sousa YT, Daré AM. Denture-related oral mucosal lesions in a Brazilian school of dentistry. J Oral Rehabil. 2004 Feb; 31(2): 135-9. http://dx.doi.org/10.1111/j.1365-2842.2004.01115.x. PMid:15009597
11. Canger EM, Celenk P, Kayipmaz S. Denture-related hyperplasia: a clinical study of a Turkish population group. Braz Dent J. 2009; 20(3): 243-8. http://dx.doi.org/10.1590/S0103-64402009000300013. PMid:19784472
12. Jo' zefowicz W. The influence of wearing dentures on residual ridges: a comparative study. J Prosthet Dent. 1970 Aug; 24(2): 137-44. http://dx.doi.org/10.1016/0022-3913(70)90136-8. PMid:5271099
13. Campbell RL. A comparative study of the resorption of the alveolar ridges in denture-wearers and non-denture-wearers. J Am Dent Assoc. 1960 Feb; 60: 143-53. PMid:13807301.
14. Tolstunov L. Management of biomechanical complication of implant-supported restoration of a patient with combination syndrome: a case report. J Oral Maxillofac Surg. 2009 Jan; 67(1): 178-88. http://dx.doi.org/10.1016/j.joms.2008.09.013. PMid:19070766
15- Cunha LDAP, Rocha EP, Pellizzer EP. Prevalência da Síndrome de Kelly em usuários de prótese parcial removível. RGO – Rev Gaúcha Odontol. 2007 Out-Dez; 55(4):325-8.
16. Cunha LD, Pellizzer EP, Verri FR, Falcón-Antenucci RM, Goiato MC. Influence of ridge inclination and implant localization on the association of mandibular Kennedy class I removable partial denture. J Craniofac Surg. 2011 May; 22(3): 871-5. http://dx.doi.org/10.1097/SCS.0b013e31820f7d6a. PMid:21558932
17. Palmqvist S, Carlsson GE, wall B. The combination syndrome: a literature review. J Prosthet Dent. 2003 Sept; 90(3): 270-5. http://dx.doi.org/10.1016/S0022-3913(03)00471-2. PMid:12942061
18. Tolstunov L. Combination syndrome symptomatology and treatment. Compend Contin Educ Dent. 2011 Apr; 32(3): 62-6. PMid:21560744.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

*CORRESPONDING AUTHOR

Camila Maria Bastos Machado de Resende, Rua Ilíria Taveres Galvão, 52/701, Bloco B, Tirol, 59022-460 Natal - RN, Brasil, e-mail: cmbmachado@hotmail.com

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