FREQUENCY OF SIGNS OF KELLY'S SYNDROME IN PATIENTS PRESENTING TO THE PROSTHODONTIC DEPARTMENT OF KHYBER COLLEGE OF DENTISTRY

Afsheen Akhtar[1], Amira Qadeer[1], Sheema Shakir[1], Asifullah Khan[1], Akbar Khalil[1], Jawad Rafique[1]

Department of Prosthodontics , Khyber College of Dentistry, Peshawar .

ABSTRACT

Objective: *The purpose of this study was to evaluate the frequency of signs of combination syndrome in patients seeking treatment for edentulous maxilla and the effect of wearing Kennedy class 1 removable partial denture in the lower arch on the frequency of signs of combination syndrome.*

Materials & Methods : *Sample consists of 100 patients , who were seeking treatment for edentulous maxilla , in the department of prosthodontic KCD Peshawar..An intra oral examination was carried out to find the combination signs as described by Kelly i.e; palatal papillary hyperplasia ,maxillary bone resorption ,overgrowth of tuberosity ,extrusion of mandibular anterior teeth ,bone loss in mandibular posterior region . The chi-square test at the 95% level of significance was used to test the association between dependent and independent variables.*

Results : *Extrusion of mandibular anterior teeth was the most frequent sign (38%). The association between removable partial denture wearer was only significant for the mandibular anterior teeth extrusion (p=0.019).*

Conclusion : *It was found that signs of combination syndrome were quite frequent except for papillary hyperplasia and over growth of tuberosity. There was no association between the occurrence of combination syndrome signs and wearing of removable partial denture in lower arch.*

Keywords : *combination syndrome ,distal extension removable partial denture , papillary hyperplasia ,extrusion ,kennedy class 1.*

INTRODUCTION

Failure to restore partially edentulous patients , who have lost their posterior teeth in both the arches, will result in the consequences that are difficult to manage with conventional prosthodontic treatment. Management of such challenging cases require the clinician to have adequate experience along with the advanced restorative and surgical skills.[1]

Patient cooperation during the whole treatment duration is also mandatory. Management of a Combination syndrome patient with conventional maxillary and mandibular removable prosthesis presents many difficulties during and after treatment completion and may require frequent remakes and patient may still be unsatisfied . Therefore, a multidisciplinary approach is required for the management of patient with combination syndrome is often.[1]

The situation worsens when a maxillary complete denture opposes a mandibular removable partial denture. Kelly, in 1972, from clinical observations, verified the presence of some of these key clinical signs: 1.Loss of bone from the anterior part of the maxillary ridge, 2.Overgrowth of the tuberosities, 3.Papillary hyperplasia in the hard palate, 4.extrusion of the mandibular anterior teeth, 5.Loss of bone under the partial denture bases. Kelly named these changes as "Combination Syndrome".[2] Saunders, et al, in 1979, added 6 more characteristic features to the list: 1.Loss of vertical dimension of occlusion, 2.occlusal plane discrepancy, 3.anterior spatial repo-

Correspondence:
Dr. Afsheen Akhtar
Post Graduate Resident, Department Prosthodontics Khyber College of Dentistry Peshawar
Email: afsheenakhtar9@gmail.com
Contact: +923445916151

sitioning of the mandible, 4.Poor adaptation of the prosthesis, 5.Epulis fissuratum, and 6.Periodontal changes.[3, 4]

Glossary of Prosthodontic has defined combination syndrome as characteristic features that occur when an edentulous maxilla is opposed by natural mandibular anterior teeth and a mandibular bilateral extension-base removable partial denture, including loss of bone from the anterior portion of the maxillary ridge, hyperplasia of the tuberosities, papillary hyperplasia of the hard palate's mucosa, supra eruption of the mandibular anterior teeth, and loss of alveolar bone and ridge height beneath the mandibular removable partial denture bases.[2 , 5]

Attempts have been made to improve the design and materials used in the fabrication of removable dentures to improve the outcome of conventional prosthodontic treatment in the management of combination syndrome patients, but resorption of the edentulous ridges and secondary modifications of the surrounding soft tissues are factors difficult to control. Occlusal instability is difficult to prevent due to continual resorption of the residual ridge, even with maximal coverage of the available support bearing area. Changes resulting in loss of Vertical dimension of Occlusion leads to closed bite and concentration of occlusal forces in the anterior segments of the dental arches, overloading the anterior edentulous maxilla.[6]

Biomechanical factor has also been attributed to the development of changes seen in combination syndrome patient. The presence of mandibular anterior teeth in patient with edentulous maxilla and partially edentulous mandible, tend to move the occlusal contacts to the anterior segment. Natural teeth tend to increase the ability to generate maximum bite forces along with advantage of proprioception. During excursive movements and parafunction habits results in excessive forces on the anterior edentulous ridge leading to the rapid ridge resorption and resulting soft tissue hyperplasia.[2 ,6]

According to Kelly, rehabilitation of patients with combination syndrome is a common clinical scenario faced by clinicians . These patients represent 26% of the patients rehabilitated with complete denture according to data provided by his observations. Of these, 24% patients are likely to develop these alterations at different levels of severity.[2, 7]

As most of the edentulous patients are managed by undergraduate students , this study can help in better management of such patients and special measures need to be taken in order to prevent combination syndrome signs. This study was conducted to find out the most frequent signs of combination syndrome and the role of kennedy class1 lower arch removable partial denture in the prevention of destructive CS signs in patients who visited the department of prosthodontics, Khyber college of Dentistry. The null hypothesis of the study was that the occurrence of characteristic features of combination syndrome are not related to the presence of a removable partial denture in the mandibular arch.

MATERIALS AND METHODS

A cross sectional study was conducted at the Department of Prosthodontics, Khyber College of Dentistry, Peshawar with the approval of the ethical committee of the hospital. The sample was selected from patients, who were seeking treatment, with a completely edentulous maxilla and bilateral partially edentulous mandible, wearing or not wearing a removable partial denture. Patients wearing temporary removable partial denture in the mandibular arch or patients with poor general health that may aggravate the bone resorption were not included in the study.

Informed consent was signed by the patients, followed by a detailed interview regarding their history of edentulism and prosthesis, if any. The patients were then clinically examined by two trained researchers who made a joint observation to determine the presence or absence of clinical signs specific for combination syndrome, as described by Kelly given in the Table 1. A third examiner, expert in the matter, was consulted whenever any inconformity was faced regarding presence or absence of the established criteria.

The variables were presented in a descriptive manner by means of frequency and means. A chi square test, with a significance level of 5% was used to determine the association between clinical signs and the presence of mandibular RPD.

RESULTS

The sample comprised of 100 patients with a mean age of 59 ± 4.12 years, where 39% (n =39) were men and 61% (n =61) women. These individuals had maxillary edentulism for a mean period of

18 ± 3.6 years.

Of the sample observed, 32% of the patients wore RPD. Table 2 shows the frequent clinical signs of Combination syndrome, the most common being the extrusion of mandibular anterior teeth which was 38%, followed by 17 % mandibular bone resorption with the least frequent being the palatal papillary hyperplasia which was 7%. The number of signs per patient were determined and shown in Table 3 .The most frequent occurrence was patients showing 1 sign in 33%, 2 signs in 20% and 3 signs were in 4%. With respect 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 (0.019) as shown in Table 4.

Table 1: Description of the Clinical Examination8

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

Table 2: Prevalence of signs of combination syndrome

Syndrome sign	Presence		Absence		Total	
	N	%	N	%	n	%
Extrusion	38	38	62	62	100	100
Tuberosity overgrowth	11	11	89	89	100	100
Palatal Papillary hyperplasia	7	7	93	93	100	100
Maxillary resorption	12	12	88	88	100	100
Mandibular resorption	17	17	83	83	100	100

Table 3: Frequency of clinical signs of combination syndrome per individual

Combination Syndrome		
No of signs	**N**	**%**
0	43	43
1	33	33
2	20	20
3	4	4
Total	100	100.0

DISCUSSION

It has always been considered a challenge for the clinician to manage patients with an edentulous maxilla opposing natural anterior mandibular teeth and a bilateral distal extension removable partial denture. The prevalence rate of such combination is 24% of the denture patients Therefore ,it is mandatory for the dentists to understand the particular problems and management of such patients with comprehensive treatment plan.[9]

In the present study, the frequency of signs of combination syndrome were assessed. There is no indication in the dental literature that all the signs must be present to diagnose combination syndrome. In the present study, 57% of the patients presented with 1-3 signs of combination syndrome. None of the patients reported with all the 5 signs of combination syndrome.[10]

In the present study, 38% of the sample showed lower anterior dental extrusion, the combination syndrome sign most frequent among the dependent variables studied. The literature indicates that presence

Table 4: Association between signs of CS and RPD wearing

CS Feature	RPD wearing						P value
	Wearer		Non wearer		Total		
	N	%	N	%	N	%	
Extrusion							
Present	14	58.3	24	31.6	38	38	0.019
Absent	10	41.6	52	68.4	62	62	
Tuberosity overgrowth							
Present	2	8.3	9	12	11	11	0.632
Absent	22	91.6	67	88	89	89	
Mandibular resorption							
Present	7	29	10	13	17	17	0.069
Absent	17	71	66	87	83	83	
Papillary Palatal hyperplasia							
Present	2	8.3	5	6.6	7	7	0.769
Absent	22	91.6	71	93.4	93	93	
Maxillary resorption							
Present	3	12.5	9	11.8	12	12	0.931
Absent	21	87.5	67	88.2	88	88	

of removable partial denture prevents the appearance of some signs. The present study found no evidence that wearing of RPD prevents the appearance of combination syndrome signs, similar to the study by Resende et al.[8] Anterior dental extrusion was the only clinical sign that showed association with RPD wearing i.e. RPD wearers showed more dental extrusion than non RPD wearers. It could be due to unsatisfactory dentures or the individuals already had dental extrusion when the RPD was provided or the dental arches were not simultaneously rehabilitated.

The present study indicated a higher percentage of mandibular bone resorption in individuals wearing RPD (29% as compared to 13%). In a comparative study, Jozefowicz[11] observed that individuals who did not wear dentures had significantly less residual ridge resorption than individuals who wore removable partial dentures. In the present study, 17 % of the sample showed mandibular posterior bone resorption, the second most frequent CS clinical sign among the dependent variables studied (Table 2). There are two main factors which may account for the bone resorption. First is, bone resorption is a natural phenomenon. It mostly reduces the bone in height, making this clinical feature common among these patients. Second is the quality of denture fit, Poorly fitting dentures cause the induction of non-axial forces accelerating the residual ridge resorption. According to Tolstunov, bone is deposited and resorbed according to the nature of forces placed upon it.[11]

The papillary hyperplasia of palate was reported in 7% of the patients. This was the least common sign observed in our study. Palatal papillary hyperplasia is considered one of the classical feature of CS. It is an inflammatory condition caused by poorly fitting upper dentures and poor denture hygiene .In studies conducted on denture users, the prevalence of hard palate papillary hyperplasia is not common .In study conducted on prevalence of CS signs , papillary hyperplasia was the least common sign i.e; 16.1 % in the sample of 66 patients.[8] MacEntee et al. observed palatal hyperplasia in 8% of 155 denture wearers.[13] Epidemiological study conducted by Xie et al found values that ranged from 5% to 10%.[14] There was prevalence of 16.7% of papillary hyperplasia in a sample of 334 denture wearers.[15] In Turkey, a study was conducted in which incidence of papillary hyperplasia was observed .It increased with time of denture wearing to 13.3 % when denture was used for 10 years and to 86.7 % when used for more then 10 years.[16]

The literature shows that, use of removable partial denture prevents the residual ridge resorption.[3]

The present study found no association between RPD wearing and prevention of signs of CS. The only clinical sign that showed an association with RPD wearing was tooth extrusion. i.e; RPD wearers had more extrusion than non -wearers. This result might be due to unsatisfactory lower dentures or that residual arches were not rehabilitated with dentures simultaneously, or individuals had developed the signs before removable dentures were given. Jozefowicz conducted a comparative study on the influence of denture wearing on residual ridge resorption . He found out that wearing denture had prevented residual ridge resorption except for females more than 60 years of age.[11] Alveolar bone resorption is an unavoidable natural phenomenon after tooth loss. However, this process can be slowed down by the construction of good quality dentures, scheduled follow-up sessions and proper guidance on denture wearing and care.[17]

The main treatment objectives in the prevention of CS signs, are preservation of posterior occlusion and anterior hyper function of the remaining mandibular teeth.[18] One treatment modality to prevent CS is the provision of good quality RPD to prevent bone resorption ,restore the posterior teeth with balanced occlusion and regular recall visits for maintenance.[12] In constructing the denture for the patients who already show CS signs ,papillary hyperplasia can be minimized by surgical procedures , muco static impression for the flaccid tissues, provision of cast partial denture in mandible with correct surveying, placement of rest and clasps, periodic recall visits to assess the fit , hygiene ,occlusion and need for relining for these patients.[19] The mandibular kennedy class 1 and 2 can be converted to kennedy 3 by providing implants in the posterior region of the mandible ,this will not only reduce the vertical and horizontal movements of the RPD resin base but also improves masticatory efficiency ,stability and aesthetics.[20] Implant supported RPD reduces the bone resorption in the mandible.[4] Implant supported removable partial dentures can be given in both arches to minimize the bone resorption associated with combination syndrome.[21]

In present study, signs of combination syndrome were mostly due to inadequate surgical and prosthodontic treatment and lack of follow up. This can be changed when the dentist dealing with susceptible patients has the knowledge about benefits of prevention, timely diagnosis and early intervention so that damages can be reduced. To evaluate the benefits of provision of RPD in preventing CS signs and reduction bone resorption randomized control trials and longitudinal studies should be conducted .

One of the limitation in this study was that the sample was collected from the patients who were seeking prosthodontics treatment ,there is a chance that these patients may have already developed signs of combination syndrome and they would be using inadequate dentures for the long time. Also it was a cross sectional study, so there was no follow up.

CONCLUSION

It was found that signs of combination syndrome were quite frequent except for papillary hyperplasia and over growth of tuberosity. Most of the patient showed 1-3 signs of combination syndrome. There is no association between the occurrence of combination syndrome signs and wearing of removable partial denture in lower arch.

REFERENCES

1. Rajendran S, Baburajan. Combination Syndrome. International Journal of Prosthodontics and Restorative Dentistry. 2012;2:156-160.
2. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. The Journal of Prosthetic Dentistry. 1972;27(2):140-150.
3. Saunders T, Gillis R, Desjardins R. The maxillary complete denture opposing the mandibular bilateral distal-extension partial denture: Treatment considerations. The Journal of Prosthetic Dentistry. 1979;41(2):124-128.
4. Palmqvist S, Carlsson G, wall B. The combination syndrome: A literature review. The Journal of Prosthetic Dentistry. 2003;90(3):270-275.
5. Glossary of Prosthetic terms, Edition 9, J Prosthet Dent 2017;117(5):1-105
6. Salvador MCG, 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;15(1):9-13
7. Shen K, Gongloff RK. Prevalence of the 'combination syndrome'among denture patients. J Prosthet Dent. 1989;62:642-4.
8. Resende CM, Ribeiro JAM, Dias KC. Signs of combination syndrome and removable partial denture wearing Rev Odontol UNESP. 2014 Nov.-Dec.; 43(6): 390-395

9. Shen K, Gongloff RK. Prevalence of the 'combination syndrome' among denture patients. J Prosthet Dent 1989; 62: 642-4.

10. 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.

11. Jo' zefowicz W. The influence of wearing dentures on residual ridges: a comparative study. J Prosthet Dent. 1970 Aug; 24(2): 137-44.

12. Tolstunov L. Combination syndrome: classification and case report. J Oral Implantol. 2007; 33(3): 139-51.

13. MacEntee MI, Glick N, Stolar E. Age, gender, dentures and oral mucosal disorders. Oral Dis. 1998 Mar; 4(1): 32-6.

14. 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.

15. 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.

16. 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.

17. Kelsey CC. Alveolar bone resorption under complete dentures. J Prosthet Dent. 1971 Feb; 25(2): 152-61.

18. 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.

19. 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.

20. 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.

21. Tolstunov L. Combination syndrome symptomatology and treatment. Compend Contin Educ Dent. 2011 Apr; 32(3): 62-6.