ORIGINAL ARTICLE

ASSOCIATION OF LATERAL EXCURSIVE CONTACTS SCHEMES WITH DEMOGRAPHIC CHARACTERISTICS AND STATIC OCCLUSAL RELATION

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ABSTRACT

Occlusion is an important determinant for proper mandibular movements during various functions of the Jaws.Aim of the study was to observe the frequency of the occlusal scheme mostly found in local population of Peshawar from March 2018 t0 September 2018. 110 participants were selected and examined following inclusion criteria. Occlusal bite paper / articulating paper were used to assess the contacts of teeth during dynamic occlusal relationship. These were measured with stainless steel scale. Static occlusal relationship was checked during intraoral examination. Teeth contacts on Maximum intercuspation, protrusive and lateral excursion were observed.Chi- Square and ANOVA were applied. Results showed that group function is reported to be more prevalent (57.3 %), followed by canine guided (29.1 %), Combination (8.2 %) and unclassified (5.5 %) occlusal schemes. Group function was more prevalent in both male (55.6%) and female (44.4 %) participants. The Chi-Square estimate corroborated that the presence of occlusal Interferences are significantly associated (Chi-Square = 0.000) with type of occlusal schemes.

Group function was reported as highest among the participant. Overbite and overjet appeared to play insignificant role in the type of occlusal scheme.

Key Words: *Occlusion, Canine guided, Group function*

INTRODUCTION

Smooth, harmonious and synchronized mandibular movements are important for effective and predictable-masticatory efficiency after restorative procedures. The various determinants of these mandibular movements are the temporomandibular joint, different muscles, and teeth.Out of these, the diversified arrangement of teeth in an arch plays a pivotal role in mandibular movements in centric and eccentric positions. The height, width, occlusal morphology, relation with occlusal plane of the teeth and their position in the arch are the factors which determine the guidance of the mandible in different directions.[1]

Various arrangements of occlusal schemes found mostly are the canine guided/ mutually protective, group function and balanced occlusion. Among these canine guided and group function are mostly adopted for various restorative procedures in dynamic occlusion. However normally the occlusal scheme may change from one form to another form as the age progresses because of tooth wear. Many studies have emphasized the importance of canine guided occlusion in lateral excursions as the preferred type of occlusion; however at the other end no such type of occlusion is present in early dentition before the age of 12. Many investigators agree that no any single pattern of occlusion is predominant in nature and every type of occlusion has its own merits and demerits because of variability of loading in each case. Group function and balanced occlusion has been termed as the acceptable form of occlusion where teeth in balanced occlusion have less mobility.[2-4]

According to Panke et al the frequency of canine protected occlusion declined with age. He advocated it to be suitable for younger patient especially in prosthodontics rehabilitation.[5]A study concluded that canine-protected occlusion is preferable over group function as it has decreased effect on the posterior teeth stresses.[6] Statistics show that group function is more prevalent form of occlusal schemes as observed by Beyron and more recently by Asawaworarit and in local study by Aslam K.[7-10]

Preferring one form of occlusal scheme over the

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other is depended mainly on the individuality of existing occlusal relation, tooth mobility index and fremitus of involved teeth. Arriving at a conclusion to adapt a lateral occlusal scheme for a patient seeking comprehensive prosthodontics treatment, usually entails us to know the prevalent occlusal schemes that exist naturally in that population. The aim of the study was to observe the prevalence of the occlusal scheme mostly found in our locality and adapting it for the relevant strata of patients to follow the natural pattern of occlusion.

MATERIALS AND METHODS

The study population included one hundred and ten (110) systemically healthy dentate subjects in Peshawar Dental College, Peshawar. The study was conducted from March 2018 to September 2018. The age of the participants ranged from 19 to 45 years. Verbal informed consent was obtained before the examination. Subject having skelelal Angle Class I, no orthodontics history, permanent dentition, no large carious lesion,no malocclusion and cross bite were included in the study.

Participants having history of bruxism, maxillofacial surgery/ trauma and non-bacterial tooth surface loss were excluded from the study. Occlusal bite paper/ articulating paper were used to assess the contacts of teeth during dynamic occlusal relationship.[19] These were measured with stainless steel scale.[18]Static occlusal relationship was checked during intraoral examination. For this purpose participants were seated in dental chair in an upright position. Vertical and horizontal overlaps were measured clinically. Vertical evaluation of the dentition focuses on overbite, or the amount of overlap of the upper and lower incisors. Over jet is measured as the distance between the upper and lower incisors at the point of greatest severity. It is measured from the facial surface of the more lingual tooth (usually the mandibular incisor) and the incisal edge of the more facial incisor (usually in the maxilla).[18]

For lateral excursions and occlusal interferences both working and balancing side occlusal contacts were recorded. During protrusions the articulating paper was positioned posterior to canine and contacts were observed during these movements. For this purpose the participants were guided to close in a maximum intercuspal position. The movements were observed both for the working and non-working side. For protrusive contacts an edge to edge upper and lower anterior teeth contact was observed with the aid of articulating paper.[18]

For the association between occlusal schemes with demographic data as well as with the presence of interferences, Chi- square test was used.Vertical and horizontal overlap distances were compared with the types of occlusal schemes by using the One-way analysis of variance (ANOVA). The probability value to determine the significance level for all statistical analysis was set at p=0.05

RESULTS

The types of the occlusal scheme frequency are underscored in Table 1. The total of 110 subjects was examined. The frequencies with their percentages are illustrated to show the overall contribution of each occlusal scheme among the subjects examined. The estimated results reveal that group function is reported to be more prevalent (57.3 %), followed by canine guided (29.1 %), Combination (8.2 %) and unclassified (5.5 %) occlusal schemes.

There are several factors such as personal attributes of the individual that can affect the types of functional occlusal schemes. Among these personal attributes, gender and age can be deemed as substantial factors. Therefore, types of occlusal schemes distribution were compared with gender and age of the examined subject in Table 2 and 3 respectively. Table 2 depicts that group function was more prevalent in both male (55.6%) and female (44.4 %) participants. But the differences between the genders with type of occlusal schemes were found to be statistically insignificant as chi sq value was computed to be 0.230.

The age of the subjects was categorized in 5 groups. The group 1 includes the subjects whose age ranges from 18 to 25 years, group 2, 3, 4 and 5 ranges from 26 to 30 years, 31 to 35 years, 36 to 40 years, 41 and above respectively. It is further demonstrated in Table 3 that canine guided occlusal scheme was more prevalent in young subjects (Group 1). Whereas, the group function was observed in age group 2, 3 and 4. However, the estimated data illustrates that subjects in Group 5 were observed with unclassified occlusal scheme.

The presence of occlusal interferences was compared with the type of occlusal Schemes in Table 4. The findings revealed that in subjects with canine guided occlusion, majority were with no occlusal interferences (56.2 %) while in rest of the occlusal schemes, occlusal interferences were shown to be present as in group function (93.7 %), combination (100 %) and unclassified (100 %). The Chi-Square estimate corroborated that the presence of occlusal Interferences are significantly associated (Chi-Square = 0.000) with type of occlusal schemes.

The descriptive statistics of the over bite and over jet shows that over bite ranges among the subjects from 1.00 mm to 2.50 mm having the mean value 1.67 with standard deviation 0.50. Whereas, over jet ranges from 0.50 mm to 2.00 mm having mean value as 1.21 with standard deviation 0.52.

TABLE 1: FREQUENCY OF TYPES OF OCCLUSAL SCHEME

	Frequency	Percent	Cumulative Percent
Canine Guided	32	29.1	29.1
Group Function	63	57.3	86.4
Combination	9	8.2	94.5
Unclassified	6	5.5	100.0
Total	110	100.0	

TABLE 2: FREQUENCY OF TYPES OF OCCLUSAL SCHEME ON THE BASIS OF SUBJECT'S GENDER

Type of Occlusion	Gender of the Respondents		Total
	Male	Female	
Canine Guided	17	15	32
	53.1%	46.9%	100.0%
Group Function	35	28	63
	55.6%	44.4%	100.0%
Combination	2	7	9
	22.2%	77.8%	100.0%
Unclassified	2	4	6
	33.3%	66.7%	100.0%
Total	56	54	110
	50.9%	49.1%	100.0%
Chi-Square = 0.230			

TABLE 3: DISTRIBUTION OF TYPE OF OCCLUSION BY AGE GROUP OF RESPONDENTS

		Age Group					Total
		1 (19 to 25 yrs)	2 (26 to 30 yrs)	3 (31 to 35 yrs)	4 (36 to 40 yrs)	5 (41 yrs& above)	
Type of Occlusion	Canine Guided	26	4	1	1	0	32
		81.2%	12.5%	3.1%	3.1%	.0%	100.0%
	Group Function	15	19	16	11	2	63
		23.8%	30.2%	25.4%	17.5%	3.2%	100.0%
	Combination	4	2	2	0	1	9
		44.4%	22.2%	22.2%	.0%	11.1%	100.0%
	Unclassified	2	0	0	2	2	6
		33.3%	.0%	.0%	33.3%	33.3%	100.0%
Total		47	25	19	14	5	110

The Anova analaysis was made to compare the occlusal schemes with over bite and over jet of the subject. The overbite of the subjects with canine guided occlusal scheme was measured highest (2.29 $\pm$ 0.21) as compared to the rest of the occlusal schemes but this difference was found statistically insignificant (p-value 0.080). Similar to this, over jet was found highest in the canine guided (1.80 $\pm$0.40) and lowest in group function (0.85 + 0.23) which was also found to be statistically insignificant (p-value 0.010)

DISCUSSION

In comprehensive prosthodontics treatment cases rehabilitation of favorable occlusal scheme is of para-

TABLE 4: DISTRIBUTION OF TYPE OF OCCLUSION BY PRESENCE OF INTERFERENCES

		Presence of Interferences		Total
		Yes	No	
Type of Occlusion	Canine Guided	14	18	32
		43.8%	56.2%	100.0%
	Group Function	59	4	63
		93.7%	6.3%	100.0%
	Combination	9	0	9
		100.0%	.0%	100.0%
	Unclassified	6	0	6
		100.0%	.0%	100.0%
		88	22	110
Total		80.0%	20.0%	100.0%

mount importance. This is more significant for tooth surface loss cases for example mutilated dentitions. A number of diversified occlusal scheme are found as documented by many studies. A study found group function and canine guided occlusal scheme to be present 81% and 5% respectively.[11] Our study also observed group function to be the most frequently found occlusal scheme(86%) in study population in general. This is in agreement with the study done by Beyron.[7]However this finding is in contrast with other studies as osbsrverd by Scaife and Holt where canine guided occlusal was the most highly observed scheme.[12]

This variation of occlusal schemes may be attributed to the dietary intake, cultural differences as well as impact of different material used to register the tooth contact. While considering the relevance of occlusal scheme to the gender related scheme it was found in our study that both genders have high percentage of group function as observed in similar studies done earlier by Koc et al, where they found it to be statistically insignificant.[13]

Study done earlier have observed canine guided occlusion to be the more prevalent in adolescence, however group function was more common and predominantantly found with increased age. Non carious tooth surface loss can be attributed to the transformation of canine guided occlusion to the group function.[14]

Our study found canine guided occlusion to be prevalent in younger patients (81%) which is in agreement with the study reported earlier by Panek et al[5]. This is the reason that canine guided occlusion is the most appropriate pattern for orthodontic and prosthodontics rehabilitation planned for younger adults, whereas group functions has been considered better choice for older patients.[5]

Occlusal interferences which prevent smooth mandibular movements are considered as a potential damage in some subjects while in other it may be un-noticed without any drastic effect on the tissues. However interferences of any type must be removed and adjusted if present on working side or non working side for protection of tooth as well as restoration from any future damage[15]. Our study found interferencesin 14 participants of canine guided occlusal schemes group, however in other occlusal schemes different occlusal interferences were found. These estimates are contrary to the findings of study done on Thias which illustrates that majority of occlusal interferences were found in each occlusal scheme which was approximately 89% and 79% in canine protected occlusion and in group function respectively.Whereas, no significant difference was found between presence of interferences and occlusal scheme.[16-17]

When occlusal schemes were compared with overbite and over jet our study observed no significant association with type of occlusal scheme. Although a review article by Sidana et al.[17]confirms that group function is indicated where the relationship of the arch doesn't permits the anterior guidance to cause the disocclusion of the non working side i.e. class 1 occlusion with extreme over jet and class 3 occlusion edge to edge and anterior open bite. There were only 2 subjects having unclassified occlusal scheme i.e. there was only one pair of opposing posterior teeth in contact like the study done by Asawaworarit.[9]

CONCLUSION

This research endeavor concludes that group function was reported as highest among the subjects. Group function was also more prevalent in both males and females. However, in young subjects canine guided was more prevalent whereas group function was reported in middle age and aged group was observed

with unclassified. Overbite and overjet appeared to play insignificant role in the type of occlusal scheme.

Limitations

Due to time and financial constraints, this study was limited to small sample size. Keeping in view the importance of this research, such research study may be conducted on larger scale to get more précised and clear results.

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