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*Research Article*

## STUDY TO KNOW THE ORTHODONTIC TREATMENT, NEED AND PRETREATMENT COMPLEXITY

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**Abstract:**

*Although work has been done in Pakistan to determine the orthodontic treatment need of patients, but still it is required to evaluate the orthodontic pretreatment complexity. A newer occlusal index; Index of Complexity, Outcome and Need (ICON) was used on a sample of 100 pretreatment study casts of the patients.*

*Place of Study:* Dental Department, Mayo Hospital Lahore, Pakistan.

*Study Duration:* Six month. From July 2018 to December 2018.

*To evaluate the need for orthodontic treatment and orthodontic pretreatment complexity grade. The data was statistically analyzed by SPSS (8.0). Overall it was found that 87% of the cases needed some sort of orthodontic treatment. 85.3 % of female patients and 92% of male patients needed treatment. More than 60% of the patients were classified as being difficult and very difficult to treat, with 34% in the very difficult to treat group. Aesthetic Component grade 8 was shown by 26% of cases. 51% had cross bite and more than 40% were having cusp-to-cusp interdigitation in the posterior segments. Results of the study showed, a high number of patients in need of the orthodontic treatment and also concluded that most of the patients undergoing treatment at the orthodontics department are difficult to treat.*

**Key words:** Occlusal indices, orthodontic treatment, pretreatment, complexity grade.

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## INTRODUCTION:

Historically orthodontic diagnosis has been taught and practiced as a descriptive, qualitative subject<sup>1</sup>. However, to get information about the prevalence of malocclusion and to quantify the severity of various features of malocclusion, several indices have been proposed<sup>1</sup>. An orthodontic index is a numerical scale that is derived by scoring specific features of a malocclusion to objectively assess some parameters<sup>2</sup>. There are five main types of occlusal indices, namely Angle's classification, epidemiological indices, treatment need indices, treatment outcome indices and treatment complexity indices<sup>3</sup>. Occlusal indices have been used to 1) identify patients with treatment needs. 2) Prioritize their treatment needs. 3) Useful tools in epidemiological studies<sup>4</sup>.

The provision of orthodontic care in terms of treatment need and treatment outcome has been assessed for many years by indices as Index of Orthodontic Treatment Need (IOTN) and Peer Assessment Rating (PAR) respectively'. To assess the treatment inputs and outcome using IOTN and PAR, two different measurement protocols must be learned and this duplication of effort is inefficient. The PAR index has been accused of undue leniency on poor finishes<sup>6</sup>. Experience with IOTN has shown that the need for treatment does not necessarily equate to the complexity of treatments. It is important to make an assessment of complexity for the following clinical reasons<sup>6</sup>. 1) To identify the most appropriate setting in which a patient should receive treatment. 2) To allow meaningful assessment of treatment outcome. 3) To identify the cases that are likely to take longer to treat. 4) To inform the patient of the likely success. The ICON index has been developed recently and claims among other things to evaluate the orthodontic treatment complexity<sup>7</sup>. ICON is based on the expert opinion of 97 practicing specialist orthodontists from Germany, Greece, Hungary, Italy, Netherlands, Norway, Spain, U.K and USA<sup>1,2,5,6,7</sup>.

This international index provides a single assessment method to record the treatment complexity, outcome and need<sup>2</sup>. Very little work has been done in Pakistan to determine the orthodontic treatment need of patients<sup>3,8</sup>, but till now no study had been done to evaluate the orthodontic pretreatment complexity grade. The purposes of our study were • To determine the orthodontic treatment need of patients at the Dental Department, Mayo Hospital Lahore, by using the Index of Complexity, Outcome and Need (ICON). • To evaluate the orthodontic pretreatment complexity grade.

## MATERIALS AND METHODS:

It was a cross-sectional, observational study, carried on 100, 5,9,10 pretreatment study casts of patients having permanent dentition, irrespective of their gender. Study casts were selected consecutively<sup>4,11</sup> from the model store of Dental Department, Mayo Hospital Lahore Pakistan, having the following inclusion criteria; undamaged, acceptable quality study casts<sup>12</sup> and presence of permanent dentition<sup>7,11</sup>. Care was taken to exclude study casts of patients, who were having; previous orthodontic treatment<sup>5</sup><sup>12</sup>, history of serial extraction<sup>8</sup> and history of extraction of any permanent teeth<sup>12</sup>. Scoring of the selected 100 sets of study casts was done, to evaluate the need for orthodontic treatment and orthodontic pretreatment complexity grade, by using ICON by the authors.

For Intra examiner reliability, 30 sets of study casts were randomly selected from the main sample and were reassessed 15 days after the initial assessment. SPSS (8.0) was used to analyze the data statistically.

## RESULTS:

The chronological age range of the sample was 11-25.5 years, with a mean age of 17.19 years (S.D 3.1). The sex distribution (Table I) was 25 males (25 %) and 75 females (75 %). The mean age of male patients were 17.12 years and mean age of female patients were 17.22 years. 87 study casts (87%) were found to be in needs of orthodontic treatment, while 13 (13%) were found to be having no need of orthodontic treatment. It was found that, out of 75 females 64 (85.33%) needed orthodontic treatment and 11 (14.66%) needed no treatment. 23 (92%) males were found to be in needs of orthodontic treatment and 2 (8%) were found, having no need of treatment.

The frequency distribution of the ICON scores of the sample is shown in Fig. II. As far as the orthodontic pretreatment complexity grade is concerned, it is clear from Fig. III, that maximum number of cases i.e. 34 (34%) were classified as having very difficult orthodontic treatment (ICON score > 77). The distribution of the cases into different grades were found to be; 2 cases (2 %) in easy treatment grade (ICON score < 29), 16 cases (16 %) in mild treatment grade (ICON scores from 29 to 50), 20 cases (20 %) in moderate treatment grade (ICON scores from 51 to 63), and 28 cases (28 %) in difficult treatment grade (ICON scores from 64 to 77). The sex distribution of the sample into different complexity grades is shown in Table. II. The value for the kappa statistics was found to be 1.

**DISCUSSION:**

In Pakistan, till now no work had been done to evaluate the orthodontic pretreatment complexity which itself is an important aspect of orthodontic treatment. The present study was aimed to get an idea

of the orthodontic pretreatment complexity grade, in addition to get an insight about the orthodontic treatment.

Table I. Distribution of male and female subjects into treatment need and no need category.

		Treatment Need		Total
		Yes	No	
Gender	Male	23	2	25
	Female	64	11	75
	Total	87	13	100

Orthodontic pretreatment complexity grade (score range)

Easy less than 29.

Mild 29 to 50

Moderate 51 to 63

Difficult 64 to 77

Very Difficult Above 77

Table II. Sex distribution of the sample into different complexity grades. Count

	Complexity grade					Total
	Easy	Mild	Moderate	Difficult	Very Difficult	
Male	0	4	4	5	12	25
Female	2	12	16	23	22	75
Total	2	16	20	28	34	100

Table III. Sex distribution of the sample into different grades of the ac.

	Aesthetic Assessment unweighted								
	1	2	3	3	3	12	1	0	25
Male	1	2	3	3	3	12	1	0	25
Female	6	9	11	10	11	14	8	6	75
Total	7	11	14	13	14	26	9	6	100

need by using a new occlusal index i.e. the Index of Complexity, Outcome and Need (ICON). Like all occlusal indices, ICON is not appropriate in assessing treatment need and treatment outcome in small number of cases. Its use does, however seems appropriate when examining a representative sample of cases from a single practitioner or from a hospital department 6. The subjects for this study were not taken from general population, but sought care and were receiving treatment at the Dental Department, Mayo Hospital Lahore. The number of female patients 75 % compared to 25 % male patients in this study clearly indicates the concern of orthodontic treatment need of females in our socioeconomic setup. Although the figure of 75 % of females is quite higher than a previously conducted IOTN survey at our department

8, but that survey was conducted on the patients reporting to the orthodontic department, while subjects of the present study were the ones who were already receiving orthodontic treatment or they were about to receive it. The results of this study showed (Table. I) that 87 % of the cases were found to be in needs of orthodontic treatment, this high figure was due to the type of the study sample as has been mentioned above. Out of these 73.5 % were females and 26.4 % were males. Overall 85.3 % of females were found to be in needs of orthodontic treatment, whereas 92 % males needed the treatment. It shows that the males who were receiving orthodontic treatment or were about to receive it, among these only 8 % were classified as having no need of treatment, according to ICON. This figure of 8% is lower than the figure of 14.66 % of

females who were found to be having no need of orthodontic treatment.

It is found that the ICON scores of the sample ranges from 21 to 105 with a range of 84 and a mean of 68. If we look at the frequency distribution of the ICON scores of the sample, it is clear that two groups of five cases i.e. 5 % each exhibited ICON scores of 62 and 69. Similarly two groups of four cases i.e. 4 % each showed the ICON scores of 71 and 89. It is clear from Table. II, that maximum number of cases i.e. 34 (34 %) were very difficult to treat, followed by 28 % being classified as difficult to treat, 20 % as moderately difficult cases to treat, 16 % as mild difficult cases to treat and 2 % as easy to treat. It is clear from the above statistics that more than 3/4 of patients belonged to difficult, very difficult and moderately difficult groups i.e. 82 % and more than half of the patients belonged to the difficult and very difficult groups i.e. 62%. In the easy group (ICON score < 29), both the two cases i.e. 100 % were females. In mild difficult cases category (ICON score from 29 to 50), 4 cases (25 %) were male patients and 12 cases (75 %) were female patients. In moderately difficult treatment group (ICON score from 51 to 63), 4 cases (20 %) were males and 16 cases (80 %) were females. In difficult treatment group (ICON score from 64 to 77), 5 cases (17.85 %) were males and 23 cases (82.14 %) were females. In very difficult treatment group (ICON score > 77), 12 cases (35 %) were male patients and 22 cases (65 %) were female patients. Value of kappa statistics of 1.0 is in the agreement with the value proposed by Landis and Koch 1. As far as the individual components of ICON are concerned. If we look at the Table III, which gives the sex distribution of the sample into different grades of Aesthetic Component (AC), it becomes clear that the highest number of cases showed AC 8 of ICON, AC 8 was exhibited by 26 cases (26 %), followed by AC 7 and AC 5 which were exhibited by 14 cases (14 %) each. The AC grade, which was shown by the least number of cases, was AC 10, being showed only by 6 cases (6%). As far as the AC 8 is concerned 18.6% females showed it, while for males these figures were 48%. For AC 10, 8% females exhibited it while for males this figure was 0 %. It shows that in general males have more aesthetic problems as is shown by AC. 78 cases (78%) showed crowding in upper arch of varying severity. Of these 78%, 26.9% were males and 73.07% were females.

### CONCLUSION:

In general, it was found that 87% of the cases needed some sort of orthodontic intervention. Out of these 73.5% were female patients. This high figure of 87% is due to the fact that subjects of the study were not

taken from general population, nor they included patients reporting to the out door of the orthodontics department, rather study sample consisted of study casts of the patients who were already undergoing orthodontic treatment at the department. Regarding distribution of the patients among different grades of the orthodontic pretreatment complexity, 82% belonged to the difficult, very difficult and moderately difficult groups and 62% belonged to the difficult and very difficult groups, making it clear that the most of the patients who are undergoing treatment at our department are difficult to treat as is assessed by ICON. AC grade 8 was shown by maximum number of cases. More than half of the patients had cross bite. More than one third of the patients had cusp-to-cusp interdigitation in buccal segments.

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