

RECORDING OF DIASTEMATA A STUDY OF SYSTEMATIC ERROR

by

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INTRODUCTION

The Greek word *diastema* is formed from *dia* = through, between and *stema* = standing, and it means space, interval. In odontological contexts a diastema signifies a space or gap between two adjacent teeth in the same dental arch, *Boucher* (1963). A diastema may arise in consequence of an incorrect eruption, physiological or pathological tooth migration or as a result of treatment.

The finding of diastemata in a bite is as a rule based upon simple inspection. When diastemata are diagnosed in this way the subjectivity of the mode of judgement is evident. The systematic deviation between different observers in recording after simple inspection has been shown by *Markén* (1962). Complete agreement between six observers was found in only 14 cases out of 64, i.e. in 22 per cent of the cases. This poor agreement is probably due to the difficulty in assessing border-line cases. The observers are confronted with a differential diagnostic problem: Where is the line to be drawn between a slight contact and a diastema?

For the determination of the size of diastema mediale a method has been launched which is based on the use of wires of different dimensions as measuring instruments (*Bergström & Jensen*, 1962). In this connection the shortest distance between the

central incisors of the upper jaw before and after a plastic operation on frenulum was measured — with an accuracy of 0,1 mm — on models.

The same method, with wires as measuring instruments, may of course also be applied to establish the existence of diastemata in a patient and therewith probably increase the degree of objectivity in the assessment, especially where it is a matter of border-line cases. For a positive recording in this connection one may require that a wire of a certain dimension shall be able to pass between two adjacent teeth.

The aim of the present study has been to investigate the reliability of a method for the recording of diastemata in the dentition. As a measure of the reliability of the method the agreement between the estimates of two observers has been used.

MATERIAL

The testees were chosen among patients who at the reception department of the School of Dentistry in Stockholm have been judged to have several diastemata. The material was divided into two groups: Group I consisting of 30 patients with a normal periodontium and Group II consisting of 20 patients with increased tooth-mobility due to periodontal disease.

METHOD

By diastema is meant in the following a space between two adjacent teeth in the normal bite which permits the passage of a wire of a given thickness. Wires of three thicknesses were used: 0.5, 1.0 and 1.5 mm. It should be possible to pass a wire without pressure through the shortest distance between the teeth down to the gingival papilla. The teeth which limit the diastema must be intact or adequately restored. The number of wires was for practical reasons limited to three, and their dimensions were chosen in order to get, in a moderately large material, as many diastemata as possible. Wires of such small dimensions were chosen also with a view to the difficulty in the estimation of small diastemata on simple inspection.

The recordings were made by two observers, A and B. Every patient was examined by both the observers independently of each other, on the same occasion and under the same condi-

Table I. *The number of diastemata recorded by at least one observer according to groups and to wire of indicated thickness.*

Group	Thickness of wire		
	0.5 mm	1.0 mm	1.5 mm
I	175	90	44
II	123	72	37

Table II. *Group I, wire diameter 0.5 mm. Distribution of recordings of 175 interdental spaces.*

		A		Total B
		no diastema	diastema	
B	no diastema	—	10	10
	diastema	10	155	165
	Total A	10	165	(175)

Table III. *Group I, wire diameter 1.0 mm. Distribution of recordings of 90 interdental spaces.*

		A		Total B
		no diastema	diastema	
B	no diastema	—	2	2
	diastema	7	81	88
	Total A	7	83	(90)

Table IV. *Group I, wire diameter 1.5 mm. Distribution of recordings of 44 interdental spaces.*

		A		Total B
		no diastema	diastema	
B	no diastema	—	0	0
	diastema	5	39	44
	Total B	5	39	(44)

tions. In the recording the diastemata observed were noted on special forms.

RESULTS

Table I shows the number of diastemata which with a given wire-dimension have been recorded by at least one observer. It was found that a diastema recorded with a coarser wire was always found among those recorded with a finer wire. There

thus seem to be no obvious false entries on the examination form. The tables II, III and IV show the results in Group I when using three different wires. Agreement between the observers was reached in order of increasing wire-diameter in 88.5 per cent, 90.0 per cent and 88.6 per cent respectively. A comparison between the observers showed no systematic differences between the observers in the tendency to discover a diastema.

Corresponding results in Group II (the cases of periodontal disease) are shown in the tables V, VI and VII. Agreement between the observers was now reached in 91.1 per cent, 86.1 per cent and 78.4 per cent of the cases respectively. Here, too, no systematic difference between the observers was found. The percentage of agreement, 88.6% and 78.4%, respectively was not significantly lower when using the 1.5 mm wire in the Group II cases than in the "normal cases".

Table V. Group II, wire diameter 0.5 mm. Distribution of recordings of 123 interdental spaces.

		A		Total B
		no diastema	diastema	
B	no diastema	—	6	6
	diastema	5	112	117
	Total A	5	118	(123)

Table VI. Group II, wire diameter 1.0 mm. Distribution of recordings of 72 interdental spaces.

		A		Total B
		no diastema	diastema	
B	no diastema	—	4	4
	diastema	6	62	68
	Total A	6	66	(72)

Table VII. Group II, wire diameter 1.5 mm. Distribution of recordings of 37 interdental spaces.

		A		Total B
		no diastema	diastema	
B	no diastema	—	5	5
	diastema	3	29	32
	Total A	3	34	(37)

DISCUSSION

The results show a considerably better agreement than noted by *Markén* (1962). In the present material deviations exist, but they were not systematic. Thus in Group II, for example, the observers showed disagreement in 29 cases: A was the sole recorder in 14 cases, B in 15 cases.

The agreement was of the same order of magnitude within the recorded levels. The result was thus not affected by the size of the diastema. The agreement was somewhat poorer in Group II than in Group I. The intention, in including a group of persons with periodontal disease in this study, was to try to ascertain whether the reliability of the method was affected by the increased mobility of the teeth, anticipated in the cases exhibiting periodontal disease. No significant difference between the groups at the different levels was demonstrable. The dispersion of the percentages was greater, however, in Group II than in Group I. This might be explained as due to an increased tooth-mobility in this group.

The method used by *Bergström & Jensen* for the recording of diastemata proved to be considerably more reliable than the method of arriving at a diagnosis through simple inspection. The method does not, however, imply complete elimination of deviations between observers.

SUMMARY

The occurrence of diastema was recorded by using stainless steel wires of definite dimensions in one group of testees with normal periodontia and in one with periodontal disease with increased mobility of the teeth. The agreement between two observers was throughout high in both the groups. With the method indicated one obtained fewer deviations between observers than is the case when diastemata are recorded with inspection only.

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RÉSUMÉ

ENREGISTREMENT DES DIASTÈMES INTERDENTAIRES

A l'aide de fils d'acier inoxydable calibrés, l'existence des diastèmes interdentaires a été enregistrée d'une part sur un groupe de patients aux parodontes normaux et d'autre part sur un groupe de patients atteints de parodontopathies et présentant une mobilité dentaire anormale.

Entre deux observateurs, l'accord, dans tous les cas, est élevé, parmi les deux groupes.

Avec la méthode donnée, on obtient moins de contradictions entre les observateurs que lorsque le dépistage des diastèmes se fait par simple inspection.

ZUSAMMENFASSUNG

REGISTRIERUNG VON DIASTEMATA

Mit der Hilfe von Metaldrahten bestimmter Grössen ist das Diastemavorkommen teils in einer Gruppe von Patienten mit normalem Parodont teils in einer Gruppe von Patienten mit Parodontopathie und erhöhter Zahnbeweglichkeit registriert.

Die Übereinstimmung zwischen zwei Beobachter ist durchgehend gut innerhalb beide Gruppen.

Mit der angegebenen Methode werden weniger Abweichungen zwischen Beobachter erhalten als bei dem Feststellen von Diastemata durch Inspektion allein.

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