4. CLINICAL SURVEY OF THE GINGIVAL CONDITION OF ANTE NATAL AND POST NATAL WOMEN IN SYDNEY.

1. Introduction

This investigation was based on the examination of 684 pregnant women and 75 post natal patients, most of whom are of modest means. Case records were available for all patients. This survey was carried out to determine whether pregnant women exhibited a condition which can be termed Gingivitis Gravidarum, as well as to examine their periodontal state. It is impossible to have accurate criteria for gingivitis gravidarum, the ideal control being the patients themselves before pregnancy, and then observing any changes which take place during the nine months.

In assessing whether these patients had indeed, a gingivitis due to, or aggravated by, the pregnancy, it was necessary to rely on the patient's information as to whether there was bleeding, swelling or other changes now noticeable, which were not present before pregnancy commenced. In point of fact,of those patients who developed this condition during gestation and after my initial examination,many (apart from those showing gross changes) were not even aware that bleeding existed. Of the rest, all were very vague as to what stage the marked changes occurred. It can be readily appreciated that this lack of awareness on the

(part of the

patient, makes clinical assessment very difficult. Failing examination before conception, the examiner is forced to draw his own conclusions and rely on his own judgement.

Detailed questioning was often necessary to determine the condition of the gingiva before conception and this proved at times to be difficult in cases where migrant women had no command of English. However, ways and means were found.

The aim of the survey was to ascertain as to what extent gingivitis gravidarum did exist and in what form. As there are various factors which could influence the gingival condition during pregnancy, consideration was given to all pertinent items related to the patient's present and past history. In the existing clinical set up, it was impossible to investigate hormonal changes. However, this has been covered earlier in the thesis by reference to all relevent literature. After discussion with the medical staff, it was assumed that no patient suffered any nutritional deficiency, as a careful check was made by the hospttal staff as to the patient's diet. Any inability to maintain an adequate diet was overcome by the almoners.

Because of the large number of migrants who attended this hospital it was possible to consider the effect that nationality could have on the final results.

A comparison was to be drawn between the ante natal

patients and a similar group of post natal patients. It was my intention to examine a large number of those seen ante natally again after parturition, but here a major difficulty was encountered. Due to many reasons, including apathy, and despite the fact that appointments are routinely made by the hospital, only a very small percentage return for their post natal examination.

II. Method.

The examination consisted of a clinical appraisal of the oral mucous membrane and gingiva with the aid of a mouth mirror, a periodontal probe graduated in millimetres, a chip blower and a spot light. A sickle shaped explorer such as an Ash 54 was used for examining oral debris. A collapsible dental chair was kindly made available by the Preventive Dentistry Department of the Dental Hospital, and this enabled me to move easily to various departments. There is no dental surgery or equipment available at Crown Street Hospital. Each patient's periodontal condition was scored using Russell's[95] method which refers to the clinical evidence of obvious mild gingivitis as well as signs of more advanced periodontal disease. The Debris and Calculus Indexes were also scored from which the Oral Hygiene Index was calculated. In the assumption that a condition of gingivitis does exist due to the gravid state, those manifestations of gingival disturbances as classified by Ziskin and Nesse[134] were also scored. The following information was noted:- the patient's age, nationality, number of previous pregnancies (including any miscarriages), age at each pregnancy, sex of previous children, last dental visit, frequency of visits, previous gingival disturbances, frequeney of tooth brushing, number of weeks of gestation, and any relevent medical history. (See Figures One & Two.).

All examinations were carried out by me so as to ensure a standardisation of scoring.

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PERIODONTAL SURVEY HISTORY

NAME..... HOSPITAL IDENTIFICATION .....

DATE OF BIRTH..... AGE .....

NATIONALITY .....

NUMBER OF PREGNANCIES .....

AGE AT PREGNANCY .....

SEX OF CHILDREN .....

SPECIAL PROBLEMS - PREGNANCY .....

MENSTRUAL .....

DENTAL HISTORY - LAST VISIT .....

FREQUENCY OF VISITS .....

PREVIOUS GINGIVAL DISTURBANCES.....

.....

FREQUENCY OF TOOTHBRUSHING .....

MALOCCLUSION .....

PRESENT ORAL STATUS .....

GENERAL MEDICAL HISTORY .....

.....

.....

F I G U R E II

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PERIODONTAL SURVEY CHART

NAME..... AGE ..... PREGNANCY (Weeks).....

HOSPITAL NUMBER..... EXAMINER ..... DATE .....

RUSSELL'S PERIODONTAL INDEX

Score 0 1 2 (4)X-ray only 6 8 or X (Tooth Absent)

		Central	Lateral	Cuspid	Bicuspid 1	Bicuspid 2	Molar 1	Molar 2	Molar 3
Upper	Left								
	Right								
Lower	Left								
	Right								

Periodontal Index = $\frac{\text{Sum of individual scores}}{\text{Number of teeth present}}$ = =

ORAL HYGIENE INDEX

DEBRIS

Score 0, 1, 2, 3, X

	Right	Anterior	Left	Total
Upper				
Lower				
Sub-total				

CALCULUS

Score 0, 1, 2, 3, X

	Right	Anterior	Left	Total
Upper				
Lower				
Sub-total				

Buccal / Lingual

Debris Index = Calculus Index = Oral Hygiene Index =

PREGNANCY GINGIVITIS (ZISKIN)

Score 0, 1, 2, 3, 4, 5

		Central	Lateral	Cuspid	Bicuspid 1	Bicuspid 2	Molar 1	Molar 2	Molar 3
Upper	Left								
	Right								
Lower	Left								
	Right								

Epidemiological concepts had their beginnings many centuries ago. Before 400 B.C. Thucydides wrote of his belief in observing facts and judging by rule of reason.(46) One basic idea at least has persisted from this early beginning down to the present - that is the concept that epidemiology is concerned with groups of people. Until recently much of our information on the prevalence and incidence of periodontal disease has been based on clinical observations, unsupported by adequate or reliable statistical data.(116) Yet a knowledge of the extent of the problem is a basic necessity in the prevention and control of the disease.(26)

Population indexes for periodontal diseases (123) are numbers that define the relative status of a population on a graduated scale with definite upper and lower limits, for comparison with other populations classified by the same criteria and method.

No index represents a precision measurement as in physics; all rely to some extent upon the judgement of the examiner. Some may be determined very swiftly for large numbers of people, others require so much time as to limit the numbers that can be studied. Some require the use of bulky accessory aids such as X-Ray equipment, others are designed for a minimum of instruments.

The choice of an index in any specific situation should be based on the following:(101)

1. The method should be sufficiently quantitative to provide a

measure of the degree of severity of the disease in population groups.

2. The method should be practicable for use in epidemiological studies of large populations and should have speed and simplicity of application rather than complexity even when the speed and the simplicity require sacrificing some details.

3. The technique to be employed must be within the abilities of those employing them, and general practitioners should be able to use it.

4. The recording should be suitable to reduction to a final score or index which may be subjected to statistical analyses.

5. The method of choice must have definite clear cut criteria which reduce the examiner's decisions to a minimum.

Arbitrary classifications, such as mild or severe are of little value without a clear definition of the meaning of these terms.(72) Because of the differences in the examination method employed for the assessment of the disease there have been wide variations in the findings of different workers. As there has been no agreement in the system of examination it is most difficult to know whether all the past reports from the various investigations indicate a real variation in the frequency of the disease between and within the various population groups.

The two systems at present in most use for the recording

of periodontal disease are the P.M.A. Index [70] and the Periodontal Index (P.I.) [95] Briefly P.M.A. Index of gingivitis was evolved by Massler and Schour and is a method of quantitatively assessing gingival disease and is based upon the examination of each individual gingival unit in the mouth, the papillary (P), marginal (M), and the attached (a) gingiva mesial to any given tooth.

The Periodontal Index of Russell, which has been used in this survey, is a more comprehensive index covering both gingivitis and periodontitis. The condition of the investigating tissues is estimated individually for each tooth, and is scored according to a progressive scale which gives relatively little weight to soft tissue inflammation and relatively great weight to destruction of bone. The score for an individual is the arithmetic average of the scores for the teeth in his mouth. The population score is the arithmetic average of the individual score for the persons examined.

Each tooth is scored according to the clinical condition of its supporting tissues. In the absence of overt inflammation in the free gingivae, or loss of function due to destruction of investing tissues, a tooth is considered to be negative and is assigned a score of zero. The scale provides for two stages of simple gingivitis, differing only to the extent of inflammation, and scored 1 and 2. A score of 6 is assigned when a periodontal pocket is demonstrated, except when tissue destruction is so far advanced that masticatory function has been impaired; in this

case the highest score 8, is given. If radiographs are studied it is sometimes possible to detect bone resorption prior to the appearance of a frank periodontal pocket. In the clinical test such cases would be assigned an intermediate score of 4.

Criteria for the Periodontal Score

Score 0. Negative. There is neither overt inflammation in the investing tissues nor loss of function due to destruction of supporting tissues.

Score 1. Mild Gingivitis. There is an overt area of inflammation in the free gingivae, but this area does not circumscribe the tooth.

Score 2. Gingivitis. Inflammation completely circumscribes the tooth, but there is no apparent break in the epithelial attachment.

Score 4. Not used in this clinical study.

Score 6. Gingivitis with pocket formation. The epithelial attachment has been broken and there is a pocket (not merely a deepened gingival crevice due to swelling in the free gingivae). There is no interference with the normal masticatory function, the tooth is firm in its socket, and has not drifted.

Score 8 Advanced destruction with loss of masticatory function. the tooth may be loose, may have drifted; may sound dull to

percussion with a metallic instrument; may be depressible in its socket.

The most difficult decision required of the examiner is usually that of distinguishing between negative gingivae and gingivae with mild gingivitis. A score for gingivitis is only assigned when the inflammation is clearly evident at first glance in good light. The problem of a questionable diagnosis is avoided by the rule, when in doubt, assign the lower score.

The index may be applied very swiftly and a minimum of equipment is necessary.

Used in this survey also, is the Oral Hygiene Index.[47] It is composed of the Debris Index and Calculus Index. Each Index is based on numerical determinations representing the amounts of debris or calculus found on the buccal and lingual surfaces of each of three segments of each dental arch.

1. The segment distal to the right cuspid
2. The segment distal to the left cuspid
3. The segment mesial to the right and left first bicuspids.

Separate recordings are made for the buccal and lingual surfaces in recognition of the differences in oral hygiene that may exist between these surfaces. The individual indexes are derived from scores based on the fraction of tooth surface covered by debris or calculus. As there are considerable differences in the height

of clinical crowns of permanent and deciduous teeth, only fully erupted permanent teeth are scored. (A tooth is considered fully erupted when the occlusal or incisal surface has reached the occlusal plane.) Third molars and incompletely erupted teeth are not scored because of the wide variations in the heights of clinical crowns.

The two debris scores assigned to a segment are based on the buccal surface and lingual surface having the greatest surface covered by debris. The buccal score and the lingual score need not be taken from the same tooth. The surface area covered by debris is estimated by running the side of a sickle shaped explorer along the buccal, labial and lingual surfaces and noting the occlusal or incisal extent of the debris as it is removed from the tooth surface.

The method for scoring calculus is the same as that applied to debris with a specific score for subgingival deposits. The amount of calculus present is by visual examination and probing. Oral debris is the soft foreign matter adhering to the surface of the teeth. It consists of mucin, bacteria and food.

There are two scores for each segment in which there are fully erupted permanent teeth present, one score for the buccal surface, and one score for the lingual surface. The scores and criteria for oral debris are:-

Score 0. No debris or stain present.

Score 1. Soft debris covering not more than one third of the tooth surface, or the presence of extrinsic stains without other debris regardless of surface area covered.

Score 2. Soft debris covering more than one third, but not more than two thirds, of the exposed tooth surface.

Score 3. Soft debris covering more than two thirds of the exposed tooth surfaces.

Criteria for Classifying Calculus

Dental calculus[47] is defined as a deposit of inorganic salts composed primarily of calcium carbonate and phosphate mixed with food debris, bacteria, and desquamated epithelial cells. Dental calculus is divided into two types, differentiated primarily by location on the tooth in relation to the free gingival margin:

1. "Supragingival Calculus" - denotes deposits located occlusal to the free gingival margin and usually white to yellowish brown in colour.

2. "Subgingival Calculus" - denotes deposits located apically to the free gingival margin, which are usually light brown to black in colour because of inclusion of blood pigments.

When recording, the operator only notes deposits of hard calculus. Segments which have one or more permanent teeth standing are given two scores - one score for the buccal surface

segment and one for the lingual having the greatest accumulation of calculus. These two scores need not be taken from the same tooth.

The scores and criteria for oral calculus are: -

0. No calculus present.

1. Supragingival calculus covering not more than one third of the exposed tooth surface.

2. Supragingival calculus covering more than one third, but not more than two thirds of the exposed tooth surface or the presence of individual flecks of sub-gingival calculus around the cervical portion of the tooth, or both.

3. Supragingival calculus covering more than two thirds of the exposed tooth surface or a continuous heavy band of sub-gingival calculus around the cervical portion of the tooth or both.

Calculation of Indexes.

To determine an individual's Debris Index, the debris scores were totalled and divided by the number of segments scored. The Calculus Index was arrived at by the same method. Oral Hygiene Index was found by adding the two scores. Since the Debris and Calculus Indexes each had a possible scoring of from 0. to 6., the Oral Hygiene Index ranged from 0. to 12.

Massler, Schour and Schopra,[71] in 1950, suggested that

their study gave statistical proof that the examination of the anterior segments alone furnished a valid index of gingivitis of the entire mouth. However, for this survey, of course, the whole mouth was examined.

Ziskin's classification of gingivitis of pregnancy, as described earlier, was followed with one variation. No subdivision was made for Class 4.

Most patients presented themselves for their first medical examination shortly after the second month, although some, particularly the multiparae, did not come until late in their term. As a result, it is difficult to determine the actual time of onset of the gingivitis. The commencement of bleeding of the gingivae and changes in appearance are the only accurate data we can rely on.

To determine clinically whether any changes would take place and whether these anticipated changes would fall into any recognizable pattern, 141 patients were examined twice, and of these, 16 were examined a third time. So that I would not be influenced by anything that had gone before, patients examined for the second, third, or post-natal times, were done so without any reference to previous charts. For a control group, 75 post-natal patients were examined under identical conditions, at the same hospital. These were seen on the same day as they presented themselves for their final medical examination.

The two groups together, gave a total of 916 examinations carried out.

TABLE 1.

Number of Patients Seen Once	Number of Patients Seen Twice	Number of Patients Seen Thrice	Number of Post-Natal Patients	Total Number of Examinations
684	141	16	75	916

Where the patients were seen twice, it could have been a combination of first and second trimester, first and third, or second and third.

The group seen three times were seen in their first, second and third trimesters.

III. RESULTS.

The whole group generally showed poor oral hygiene, and many had badly neglected mouths with broken down teeth that had not been treated for many years. For some of the migrant women, this was their first dental examination. Most patients had some excuse - whether it be lack of finance to attend their local dentist, and reluctance to attend the Dental Hospital, over-burdening with family duties and numerous young children to care for, and for those living in outlying suburbs, the added difficulty of poor transport. Some patients simply did not realise that treatment was needed, and others took the attitude, that if the discomfort became sufficiently annoying, the tooth could be extracted. This casual approach was more prevalent in the Australian group, who were aware of their bad oral condition, but who were not prepared to seek treatment. On the other hand, the migrant groups, whose teeth were basically sound, but who showed many gingival disturbances, without experiencing any pain, did not realise that treatment was needed.

Of the patients who were examined more than once changes in the gingival condition could be noted.

Forty patients showed a definite increase in gingivitis, this being either from no gingivitis gravidarum to the presence of it, or an increase of that which was present. Thirteen patients showed a definite reduction of the gingivitis in the ninth

month without having any treatment. This follows the observation of others (55) who have observed the same decrease during the last month. Of the seventy-five post-natal patients seen six to seven weeks after delivery, sixteen had been examined ante natally. Of the sixteen, twelve had been classified as having gingivitis gravidarum. Two showed no change, and the remaining 10 showed a complete absence of the condition.

In the ante natal group, at the first examination, there were only thirty-one cases, or 4.5%, who had completely normal gingiva, with a Russell's Periodontal Index of zero. As there is a score if even one inflamed papilla is present this does eliminate many with only minor gingival disturbances. Of the 684, there were 533 who exhibited examples of gingivitis gravidarum. The gingivitis had commenced or increased after pregnancy began. The majority of these cases were of Ziskin's Class 1 and Class 2, i.e. with a tendency for the gingiva to bleed or to show a glossy appearance and a lack of stippling. The hypertrophic type, which some authorities found to be frequent, did not occur to such an extent in this survey, there being only twenty-four cases of it alone, or in combination with another type. As can be seen from Table II, sixty-two patients exhibited more than one type of gingivitis gravidarum. There were only two cases of epulis in the whole group.

Norman (79) is of the opinion that Ziskin's first three

classifications of gingivitis gravidarum may not, with certainty, be attributed to the pregnancy, but the hypertrophic type and epulis may. On the basis of my observations, I cannot agree with him. The general appearance of all cases of gingivitis fitted in with those described by Ziskin and Nesse.(134)

TABLE II.

Distribution of Type of Gingivitis

(Ziskin Classification)

At the First Examination

Type	Number of patients in group	Total Number including combination*
Class 1.	131	159
Class 2.	107	150
Class 3.	22	68
Class 4.	9	24
Class 5.	2	2
	Combination: 62.	
	Total: 333.	

Total Number of Ante Natal Patients Examined = 684.

* Combination refers to those cases exhibiting more than one type of gingivitis (Ziskin) in different areas of the mouth.

Most patients who had a gingivitis due to pregnancy did appear to have had some form of gingivitis or periodontitis beforehand. This ranged from very slight to very marked. In many instances, it was quite apparent from the overall picture, that there had been some gingival disturbance present, and that pregnancy, by some means, had aggravated the condition. Whilst there is generally a pre-existing gingivitis, authorities do claim that it can occur without any such cohditions being present.[17][35][42] There was usually no obvious reason why an increase in gingivitis should occur in specific locations in the mouth when there was already a generalised gingivitis present.

In certain patients who were examined more than once, there was a change in location, particularly if it were only mild, e.g. Ziskin Class 1, or Class 2. Bleeding had occurred in certain papillae at one stage, had regressed and commenced around other teeth. Whether this was because the patient had concentrated on better brushing in the indicated area is not certain. However, people are more inclined to brush less when bleeding occurs, so it is very unlikely that increased brushing actually took place.

Although the majority of the patients claimed they brushed their teeth, observation showed that very few carried out a proper brushing technique. On first examination some showed a mild gingivitis with a Ziskin classification of 1 or 2. When later

examined again, they showed that their gingivitis had acquired a proliferative or productive character. These were of a definite, progressive nature, and allowed more than one type to be present in the mouth at the same time. These are referred to in Table II as a combination. The occurrence of more than one type in the mouth is in agreement with Ziskin and Nesse.(134)

The oral hygiene of the mouth appeared to play an important role in some where the gingivitis coincided with large amounts of oral debris. In others, the oral hygiene was very good, with no calculus detectable, and a very low or zero debris score, and gingivitis gravidarum still occurred in these apparently clean areas.

Age.

The distribution of patients into age groups is shown in Table III and it can readily be observed that the age of the patient had no great bearing on the incidence of gingivitis gravidarum. It was present in all age groups, but the 26 - 30 year group showed the highest incidence, with a percentage of 56.2. It ranged from 28.5% in the 15 years and under, up to the maximum of 56.2%, and dropped to 34% in the oldest group. However the application of the Chi-Square test to this division of age showed that there was no statistical significance in this grouping.

Number of Pregnancies.

The number of pregnancies of each patient, including any

mis-carriages and abortions were noted from the hospital medical records, to determine if there was any factor which could influence the incidence of gingivitis gravidarum. However, from Table IV it can be seen that there is no specific pattern and once again the Chi-Square test showed no statistical significance in the frequencies of the group. The primaparae formed the largest group and with those in their second or third pregnancy composed the majority of the patients.

Weeks of Gestation.

As can be seen from Tables V and VI the patients on their first examination have been divided into groups according to their weeks of gestation. The greatest incidence of gingivitis gravidarum occurred in the 25 - 28 week group. There is an increase in each four-weekly group, commencing at 8 weeks to a peak at 25 - 28 weeks with a decline to 32 weeks and a slight increase again to the last 4 weeks of pregnancy. The incidence of gingivitis gravidarum ranged from 35.2% in 0 - 8 week group, to a peak of 61.7% in the 25 - 28 week group and down to 49.1% in the 37 week-term group. The frequency of brushing and the Russell Index, Debris, Calculus and Oral Hygiene Index for each group is given in these tables. There was no relationship between the incidence of gingivitis gravidarum in Table V and the Russell Index. The Russell Index was highest in the 33 -36 week group which exhibited one of the lower incidences of gingivitis gravidarum. Table VI gives those without gingivitis gravidarum and shows the various Indexes for each four weekly group.

TABLE III.

Distribution of Age Groups of Ante Natal Patients

At Their First Examination.

Age	Number In Group	Number With Gingivitis Gravidarum	Percentage With Gingivitis Gravidarum
15 & under	7	2	28.5
16 - 20	186	89	47.8
21 - 25	228	109	47.8
26 - 30	153	86	56.2
31 - 35	66	32	48.5
36 & over	44	15	34.0
Whole Group	684	333	48.7

Other factors which were noted during the examination, and which proved to have no bearing on the subject were: sex of previous children, menstrual disturbances, and previous medical history.

TABLE IV.

Incidence of Gingivitis Gravidarum Distributed According to the Number of Pregnancies

(Including Miscarriage)

Number of Pregnancies	Number in Group	Number with Ging. Grav.	Precentage with Gingivitis Grav.
1	273	129	47.2
2	161	90	55.9
3	108	45	41.7
4	60	32	55.0
5	34	10	29.4
6	22	13	59.1
7	9	6	66.6
8 or more	17	8	47.0
Total :	684	333	

Brushing.

The patients were questioned as to the frequency of their brushing, and if there was any doubt, the lower score was taken. They were divided into three groups.

a) Those who brushed less than once a day. Several in this group claimed that they did not brush their teeth at all, and some only once a week.

b) Those who brushed once a day.

c) Those who brushed twice a day or more.

For the majority of cases a poor brushing technique was evident. In the whole ante natal group a higher brushing score was accompanied by a lower Russell Index, Debris, Calculus and Oral Hygiene Indexes. (Table VII.). In the group with pregnancy gingivitis, the Russell score was almost the same for those who brushed less than once a day and those who brushed once daily. The Debris, Calculus and Oral Hygiene scores were progressively lower with the increased brushing. (Table VIII). In the group without pregnancy gingivitis the Russell Index showed a reverse pattern with the highest score for the group which brushed twice or more daily. The Oral Hygiene score was lower in this group with the increased brushing as was the Debris score, but the Calculus did not follow this pattern. There were, however, on thirteen patients in the group who brushed less than once daily, compared with 106 and 232 in the other two groups. (Table IX.)

TABLE V.

Division of Group into Weeks of Gestation, Showing Number and Percentage with Gingivitis Gravidarum and Distribution of Brushing Russell's, Debris Calculus and Oral Hygiene Indexes

Weeks of Gestation	No. in Group	No. with G. G.	% with G. G.	Daily Brushing less than 1.	1.	2 or more	Russell's	Debris	Calculus	Oral Hygiene
0- 8	17	6	35.2	0	2	4	2.54	2.71	1.19	3.90
9-12	66	26	39.3	3	8	15	2.25	3.29	0.39	3.68
13-16	54	26	48.1	2	5	19	2.25	2.6	0.66	3.26
17-20	65	33	50.7	4	15	14	2.78	3.46	0.84	4.3
21-24	72	38	52.7	4	14	20	2.74	3.43	1.01	4.46
25-28	81	50	61.7	4	21	25	2.78	3.26	0.72	3.99
29-32	91	39	42.8	4	20	15	2.26	3.18	0.62	3.8
33-36	118	56	47.4	5	27	24	3.03	3.31	0.81	4.14
37 to term:	120	59	49.1	8	20	31	2.68	3.15	0.8	3.95
Total:	684	333	48.7	34	132	167				

(Note: G.G. = Gingivitis Gravidarum).

TABLE VI

Division of Those Without Gingivitis Gravidarum Into Weeks of Gestation, Showing Distribution of Brushing, Russell's, Debris, Calculus and Oral Hygiene Indexes.

Weeks of Gestation.	No.in Group.	Daily Brushing less than 1.	Daily Brushing 1.	Daily Brushing 2 or more	Russell's	Debris	Calculus	Oral Hygiene
0- 8	11	0	5	6	2.46	1.91	0.55	2.47
9-12	40	1	8	31	1.57	2.4	0.42	2.82
13-16	28	1	9	18	1.55	2.63	0.53	3.16
17-20	32	1	14	17	1.26	2.11	0.48	2.61
21-24	34	1	8	25	0.9	2.32	0.4	2.72
25-28	31	3	9	19	1.38	2.84	0.68	3.32
29-32	52	3	14	35	1.34	2.49	0.56	3.06
33-36	62	1	18	43	1.2	2.04	0.46	2.46
37 to term:	61	2	21	38	1.42	2.54	0.65	3.2
Total:	351	13	106	232				

TABLE VII

Distribution of Brushing For The Whole Ante Natal Group Showing Incidence of Gingivitis Gravidarum, Russell's Index, Debris, Calculus and Oral Hygiene.

Frequency of Brushing per day.	No. in Group.	No. with Ging. Grav.	% With Ging. Grav.	Russell's	Debris	Calculus	Oral Hygiene
Less than 1 daily.	47	34	72.3	2.34	3.99	0.84	4.84
1 daily.	238	132	55.4	2.16	3.16	0.74	3.91
2 or more daily.	399	167	41.8	1.86	2.41	0.58	3.01
Total:	684	333	48.7				

TABLE VIII

Distribution of Brushing for Patients With Gingivitis Gravidarum.

Frequency of Brushing per day	No. in Group	Russell's	Debris	Calculus	Oral Hygiene
Less than 1 daily	34	2.86	4.43	1.01	5.54
1 daily	132	2.88	3.51	0.89	4.4
2 or more daily	167	2.44	2.77	0.58	3.40
Total:	333				

TABLE IX

Distribution of Brushing for Patients Without Gingivitis Gravidarum.

Frequency of Brushing per day.	Group.	Russell.	Debris.	Calculus	Oral Hygiene
less than 1. daily.	13	0.99	2.87	0.41	3.28
1. daily.	106	1.25	2.72	0.54	3.28
2 or more daily.	232	1.45	2.15	0.53	2.71
TOTAL:	351.				

Gingivitis gravidarum was more prevalent amongst those who brushed their teeth less frequently, but, never-the-less, there were some whose brushing was very irregular, (less than once a day), and still did not show any evidence of the condition. Generally, the gingivitis gravidarum was least amongst those who regularly brushed their teeth twice a day or more. The few patients encountered with a Russell score of zero or close to it all came into this category. It was found that those who brush twice or more daily, and who comprise the largest group, exhibit the lowest incidence of gingivitis gravidarum. Those who brush less than once a day, and who comprise the smallest group

exhibit the greatest.

There is a statistical significance in the observed frequencies of the distribution of brushing, showing that this is an important factor.

From my observations it became apparent that the majority of these women had no conception of the need for adequate brushing carried out with a correct technique, and at the right time. Some of the more indigent gave as a reason for not brushing, their lack of funds to purchase tooth paste, others claimed they did not want to injure their few remaining teeth by wearing them out with brushing. Still others, with badly broken down teeth, anticipated having the remaining ones extracted, and so could not see the need for good oral hygiene. This attitude was prevalent amongst those who exhibited a lower standard of education and an apparent substandard social background. It should be realised that, while this clinic imposes a means test, it is available to all unmarried pregnant women. In this group could be seen the extremes - those with a good social back ground - good education and good oral training, and those who had been inmates of institutions, or living away from home, with lack of family care and interest. (As evidenced by young girls with anterior teeth missing, and no attempt made to restore them.) These girls exhibited a lack of education and a general lack of personal cleanliness. Where some had been committed to an institution, and examined again later, there was

generally an improvement in their oral hygiene.

Nationality.

The division of patients into national groups gave rise to some interesting observations. The groups were as follows:-

a) Australasian - including New Zealanders. (All of European extraction.).

b) Italian

c) Greek

d) Maltese

e) United Kingdom

f) Middle Eastern

g) Other European

h) Miscellaneous - (those who did not fall into the above categories, including Australian born Chinese and part Aborigine).

The Italian, Maltese and Greek showed the highest incidence of gingivitis gravidarum. (See Table X.). This coincided with the fact that the greater portion of these people are in the habit of brushing only once a day. Compare this with the Australasian group, in which the greater number brushed twice a day or more. The Australasian group exhibited a much smaller percentage with gingivitis gravidarum, had the lowest Russell's Index, and the

lowest Oral Hygiene Index.

TABLE X.

Distribution of Ante Natal Group Into Nationalities, Showing Number and Percentage With Gingivitis Gravidarum.

Nationality.	No. in Group.	No. with Gingivitis Gravidarum	Percentage.
Australasian	456	191	41.9%
Italian	31	24	77.4%
Greek	50	36	72.%
Maltese	28	21	75.%
United Kingdom	34	16	47.%
Middle Eastern	12	7	58.3%
Other European	63	34	53.9%
Miscellaneous	10	4	40.%
Total:	684	333	48.7%

The following Tables - XI., XII., and XIII., show the relationship between nationality, Russell's, Debris, Calculus and Oral Hygiene Indexes, with regard to the number and percentage with Gingivitis Gravidarum. Tables XIV., XV., and XVI., deal with the National groups at their first examination, showing distribution of brushing.

TABLE XI

National Groups of all Ante Natal Patients, showing Russell's, Debris, Calculus and Oral Hygiene Indexes.

Nationality.	No.in Group	Russell's	Debris	Calculus	Oral Hygiene
Australasian	456	1.75 SD 1.493 SE±0.070	2.63	0.57	3.2 SD 2.01 SE±0.094
Italian	31	2.89 SD 1.606 SE±0.288	3.72	0.98	4.7 SD 1.786 SE±0.321
Greek	50	2.32 SD 1.507 SE±0.213	2.96	0.58	3.44 SD 1.614 SE±0.228
Maltese	28	2.51 SD 1.809 SE±0.342	3.68	1.22	4.9 SD 2.048 SE±0.387
United Kingdom	34	2.11 SD 1.354 SE±0.232	2.92	0.83	3.75 SD 1.642 SE±0.281
Middle Eastern	12	2.23 SD 2.57 SE±0.742	2.96	0.43	3.39 SD 1.938 SE±0.559
Other European	63	2.63 SD 1.75 SE±0.22	2.76	0.69	3.45 SD 1.104 SE±0.139
Miscellaneous	10	2.2 SD 1.592 SE±0.503	3.48	1.15	4.63 SD 1.819 SE±0.594
Total:	684	2.0 SD 1.09 SE±0.041	2.79	0.65	3.43 SD 1.985 SE±0.076

SD = Standard Deviation.

SE = Standard Error.

TABLE XII

National Groups With Gingivitis Gravidarum, Showing Russell's, Debris, Calculus and Oral Hygiene Indexes.

Nationality	No. in Group	Russell's	Debris	Calculus	Oral Hygiene
Australasian	191	2.45 SD 1.389 SD±0.1	3.15	0.69	3.82 SD 1.874 SD±0.136
Italian	24	3.13 SD 1.591 SE±0.325	3.91	1.04	4.96 SD 1.822 SE±0.372
Greek	36	2.68 SD 1.55 SE±0.258	2.88	0.63	3.51 SD 1.567 SE±0.261
Maltese	21	2.69 SD 1.837 SE±0.4	4.09	1.4	5.49 SD 1.932 SE±0.422
United Kingdom	16	2.43 SD 0.963 SE±0.24	3.45	0.87	4.32 SD 1.463 SE±0.366
Middle Eastern	7	3.2 SD 1.27 SE±0.48	2.49	0.38	2.88 SD 1.538 SE±0.581
Other European	34	3.31 SD 1.589 SE±0.272	2.97	0.83	3.81 SD 1.849 SE±0.317
Miscellaneous	4	3.62 SD 1.992 SE±0.996	3.83	1.41	5.24 SD 2.406 SE±1.203
Total:	333	2.65 SD 1.48 SE±0.08	3.23	0.8	3.99 SD 1.902 SE±0.104

SD = Standard Deviation

SE = Standard Error.

TABLE XIII

National Groups Without Gingivitis Grovidarum, Showing Russell's, Debris, Calculus and Oral Hygiene Indexes

Nation-ality	No.in Group	Russell's	Debris	Calculus	Oral Hygiene
Austral-asian	265	1.24 SD 1.357 SE±0.033	2.26	0.49	2.77 SD 1.995 SE±0.122
Italian	7	2.07 SD 1.641 SE±0.62	3.04	0.76	3.8 SD 1.523 SE±0.577
Greek	14	1.38 SD 0.925 SE±0.249	3.14	0.42	3.57 SD 1.338 SE±0.385
Maltese	7	1.95 SD 1.499 SE±0.566	2.45	0.66	3.11 SD 1.345 SE±0.508
United Kingdom	18	1.83 SD 1.694 SE±0.399	2.44	0.8	3.24 SD 1.786 SE±0.421
Middle Eastern	5	0.87 SD 4.149 SE±1.855	3.59	0.5	4.1 SD 1.721 SE±0.77
Other European	29	2.00 SD 1.721 SE±0.319	2.5	0.52	3.03 SD 2.4 SE±0.446
Miscell-aneous	6	1.25 SD 0.845 SE±0.345	3.24	0.97	4.21 SD 1.517 SE±0.619
Total:	351	1.37 SD 1.456 SE±0.077	2.38	0.53	2.91 SD 1.9 SE±0.101

SD = Standard Deviation

SE = Standard Error

TABLE XIV

National Groups of all Ante Natal Patients, Showing The Distribution of Brushing

Distribution of Brushing

Nationality	No. in group	Less than 1 daily No.	Less than 1 daily Percent.	Once Daily No.	Once Daily Percent.	Twice or more daily No.	Twice or more daily Percent
Australasian	456	25	5%	136	30%	295	65%
Italian	31	7	22.5%	16	51. 5%	8	26%
Greek	50	4	8%	30	60%	16	32%
Maltese	28	6	21.5%	16	57%	6	21. 5%
United Kingdom	34	2	6%	8	24%	24	70%
Middle Eastern	12	0	-	6	50%	6	50%
Other European	63	2	3%	22	35%	39	62%
Miscellaneous	10	1	10%	4	40%	5	50%
Total:	684	47	7%	238	35%	399	58%

TABLE XV

National Groups With Gingivitis Gravidarum

Showing Distribution of Brushing

Distribution of Brushing

Nationality	No. in Group	Less than 1 daily		Once Daily		Twice or more daily	
		No.	Percent	No.	Percent	No.	Percent
Australasian	191	19	10%	63	33%	109	57%
Italian	24	6	25%	14	58%	4	17%
Greek	36	4	11%	22	61%	10	28%
Maltese	21	4	19%	11	52%	6	29%
United Kingdom	16	0	-	4	25%	12	75%
Middle Eastern	7	0	-	3	43%	4	57%
Other European	34	1	3%	13	38%	20	59%
Miscellaneous	4	0	-	2	50%	2	50%
Total:	333	34	10%	132	40%	167	50%

TABLE XVI

National Groups Without Gingivitis Gravidarum, Showing Distribution of Brushing

Nationality	No. in Group	Distribution of Brushing: Less than 1 daily No.	Less than 1 daily Percent	Once Daily No.	Once Daily Percent	Twice or more daily No.	Twice or more daily Percent
Australasian	265	6	2%	73	28%	186	70%
Italian	7	1	14%	2	29%	4	57%
Greek	14	0	-	8	57%	6	43%
Maltese	7	2	29%	5	71%	0	-
United Kingdom	18	2	11%	4	22%	12	67%
Middle Eastern	5	0	-	3	60%	2	40%
Other European	29	1	3%	9	31%	19	66%
Miscellaneous	6	1	17%	2	33%	3	50%
Total:	351	13	4%	106	30%	232	66%

TABLE XVII

Distribution of National Groups With Gingivitis Gravidarum According to Weeks of Gestation.

No. of Weeks.	0- 8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-term
Austral-asian.	4	16	15	20	16	31	23	33	33
Italian	0	1	0	3	5	4	2	3	6
Greek	0	3	3	4	6	1	5	8	6
Maltese	1	2	3	3	3	3	3	1	2
United Kingdom	0	2	3	1	3	3	0	3	1
Middle Eastern	0	0	1	1	1	1	3	0	0
Other European	1	2	1	1	4	6	3	5	11
Miscell-aneous	0	0	0	0	0	1	0	3	0
Total:	6	26	26	33	38	50	39	56	59

TABLE XVIII

Distribution of National Groups Without

Gingivitis Gravidarum According

To Weeks of Gestation

No. of Weeks	0- 8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-term
Austral-asian	7	32	24	25	25	25	38	45	44
Italian	0	2	0	1	0	1	2	1	0
Greek	0	2	3	2	2	1	0	1	3
Maltese	1	1	0	0	0	1	2	1	1
United Kingdom	0	1	0	0	2	2	2	4	7
Middle Eastern	1	1	0	1	0	0	1	1	0
Other European	1	1	1	2	3	1	5	9	6
Miscell-aneous	1	0	0	1	2	0	2	0	0
Total:	11	40	28	32	34	31	52	62	61

From Table XI it is seen that the Australasian Group had the lowest Russell Index in the whole ante natal group, and this coincided with the lowest Oral Hygiene score. A fairly close relationship is observed in this Table of higher Russell scores with higher Oral Hygiene scores. The Other European Group showed a higher Russell score than most, yet its Oral Hygiene Index is only 0.2 above the mean and it exhibited 53.9% with pregnancy gingivitis compared with the mean of 48.7%. The Italian, Greek and Maltese groups, had high Russell scores and were also those with the highest gingivitis gravidarum scores.

The mean Russell score for the whole ante natal group was 2.0 with an Oral Hygiene score 3.43. On dividing them into those with gingivitis gravidarum and those without, the Russell Index for the former was 2.65 with an Oral Hygiene score of 3.99. The latter's Russell Index score was 1.37 and the Oral Hygiene 2.91.

Table XIV shows the brushing habits of all the ante natal patients by division into national groups. As was shown earlier, gingivitis gravidarum was more prevalent amongst those who brushed less frequently, and the Italian, Greek and Maltese groups fall into this category. The majority of these people brushed once a day. As they had a tendency to brush less frequently than for example the Australasian group, they

would be more prone to gingivitis even without pregnancy. Combine this less frequent brushing with a food factor of a large ingestion of farinaceous material which many consumed, and there is an ideal combination for gingival irritation.

The Australasian and United Kingdom groups who were in the habit of brushing more frequently, were amongst those with the lowest incidence of pregnancy gingivitis, and they were the two groups with the lowest Russell scores. However, 62% of the Other European group brushed twice or more daily, and still had the second highest Russell score. This did not coincide with the pattern exhibited by the other groups. They did, however, have an incidence of gingivitis gravidarum not greatly in excess of the mean of the whole ante natal group. The groups who brushed more frequently were generally the ones who exhibited less gingivitis gravidarum, and the fact that certain groups exhibited much higher figures for it seemed to be directly attributable to their brushing habits.

In Table XVII and XVIII can be seen the distribution of each national group into its various weeks of gestation according to whether or not there was a gingivitis gravidarum present.

Post Natal Patients

The group of seventy five post natal patients was drawn from the Post Natal Clinic of the same hospital, and was

chosen at random. The same examination procedure was carried out for these patients as for the ante natal group, and the same scoring indexes used. Table XIX shows a comparison of the scoring indexes of the ante natal and post natal groups. The Russell Index for the post natal group was much lower than for the ante natal, yet the Debris and Oral Hygiene Indexes were much higher.

The Russell Index is not an indicator of increase or decrease of gingivitis gravidarum. Therefore it can only be stated that the post natal group exhibited less gingivitis than the ante natal group even with the presence of increased oral debris. This could imply that debris is not the only factor involved. Whether the absence of pregnancy in the post natal group is the cause is open to question and cannot be determined by the Russell score.

Of the sixteen patients seen both ante and post natally, twelve of these had been diagnosed ante natally as having gingivitis gravidarum. Post natally, ten showed an amelioration of the condition, and only two remained unchanged. Although these ten still exhibited some gingivitis, it was far less, and could not be described as a typical Ziskin-type gingivitis. It must be remembered that the oral habits of these patients had not altered - nor had they had any treatment. This was only six to seven weeks after parturition.

TABLE XLX

Relationship of Ante Natal and Post Natal Group Showing Russell's, Debris, Calculus and Oral Hygiene Indexes

	All Ante Natal Patients	Patients with Ging.Grav.	Patients without Ging. Grav.	Post Natal Group
Number in Group	684	333	351	75
Russell's Index	2.00 SD 1.09 SE±0.041	2.65 SD 1.48 SE±0.031	1.37 SD 1.456 SE±0.077	1.69 SD 1.16 SE±0.134
Debris Index	2.79	3.23	2.38	3.45
Calculus Index	0.65	0.8	0.53	0.57
Oral Hygiene Index	3.45 SD 1.935 SD±0.076	3.99 SD 1.902 SE±0.104	2.91 SD 1.9 SD±0.101	4.05 SD 1.594 SD±0.184

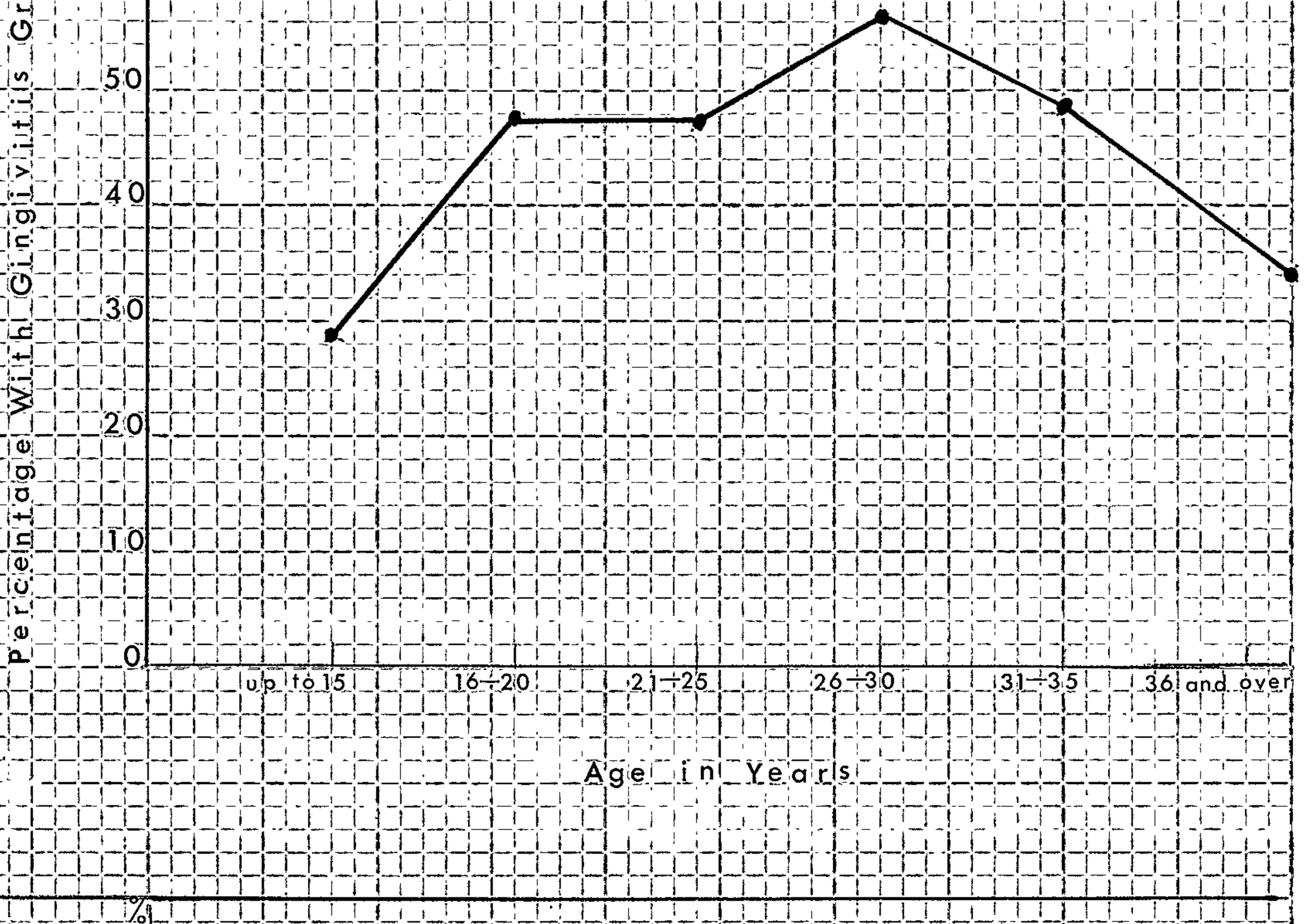
SD = Standard Deviation.

SE = Standard Error.

INCIDENCE OF GINGIVITIS GRAVIDARUM ACCORDING TO: a) AGE

b) WEEKS OF GESTATION

graph a)



graph b)

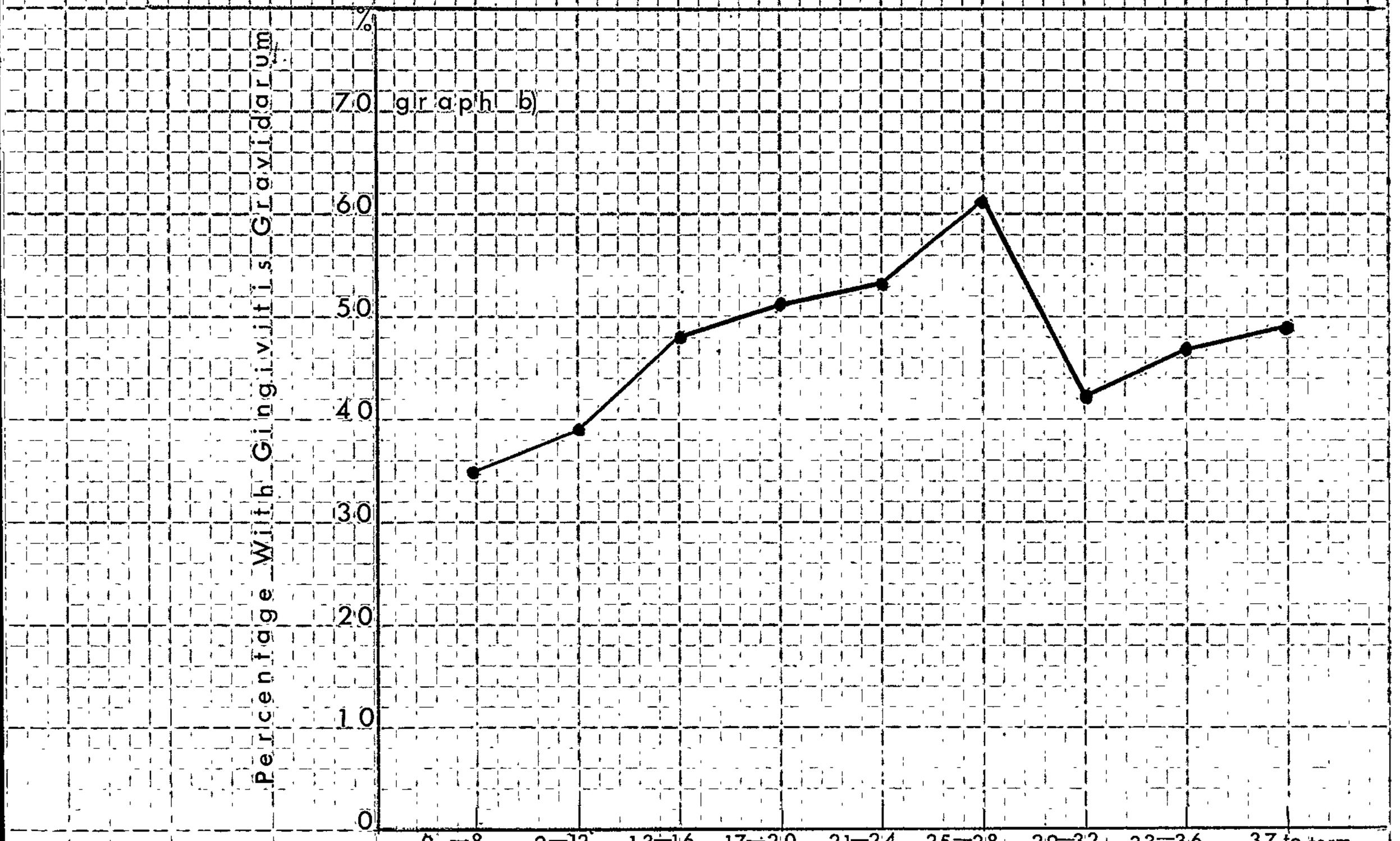


FIGURE III

INCIDENCE OF GINGIVITIS GRAVIDARUM ACCORDING TO NUMBER OF PREGNANCIES

RELATIONSHIP BETWEEN BRUSHING AND GINGIVITIS GRAVIDARUM

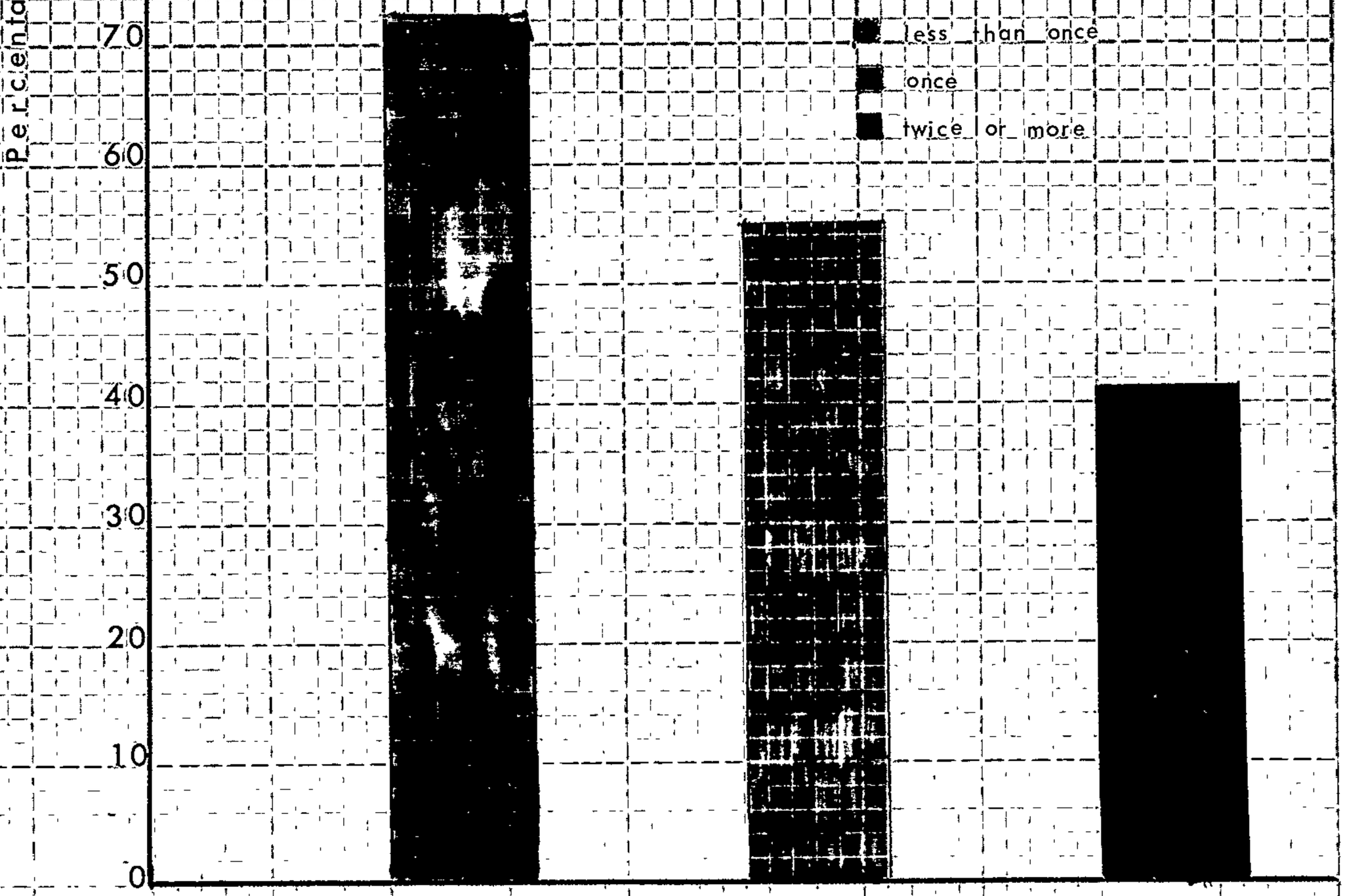


FIGURE IV

FIGURE V

DISTRIBUTION OF BRUSHING OF NATIONAL GROUPS

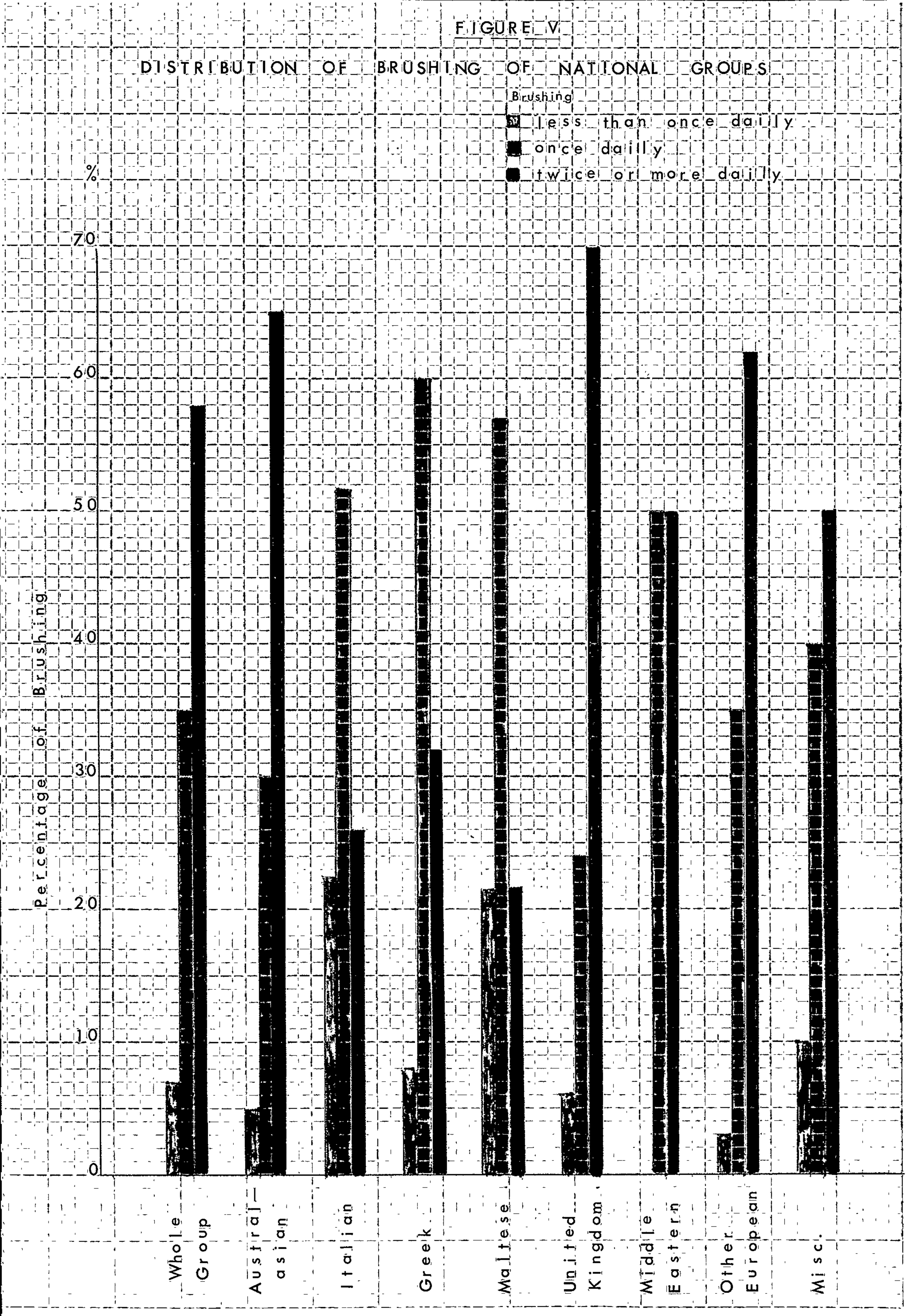
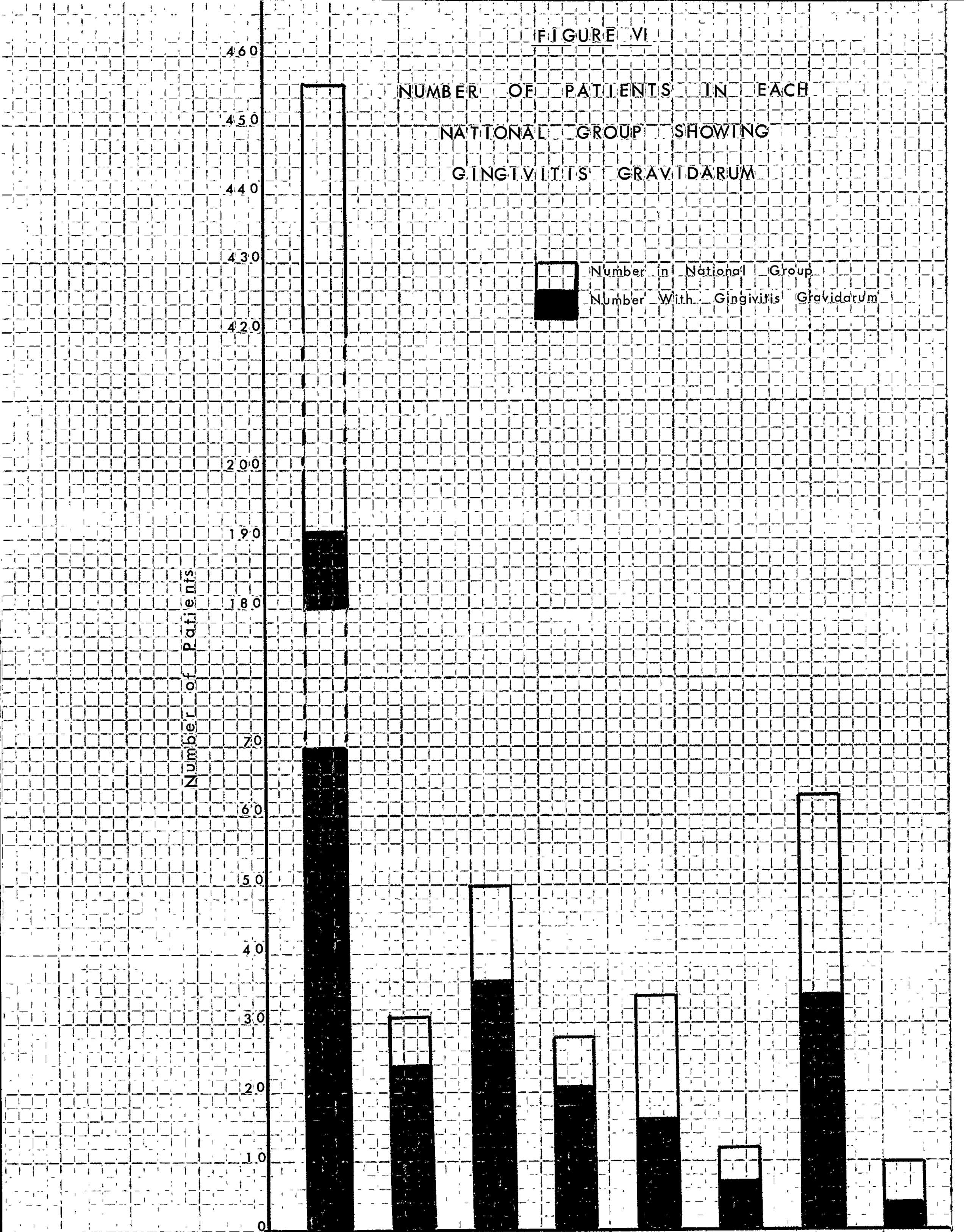


FIGURE VI

NUMBER OF PATIENTS IN EACH NATIONAL GROUP SHOWING GINGIVITIS GRAVIDARUM



FREQUENCY OF BRUSHING OF NATIONAL GROUPS WITH GINGIVITIS GRAVIDARUM

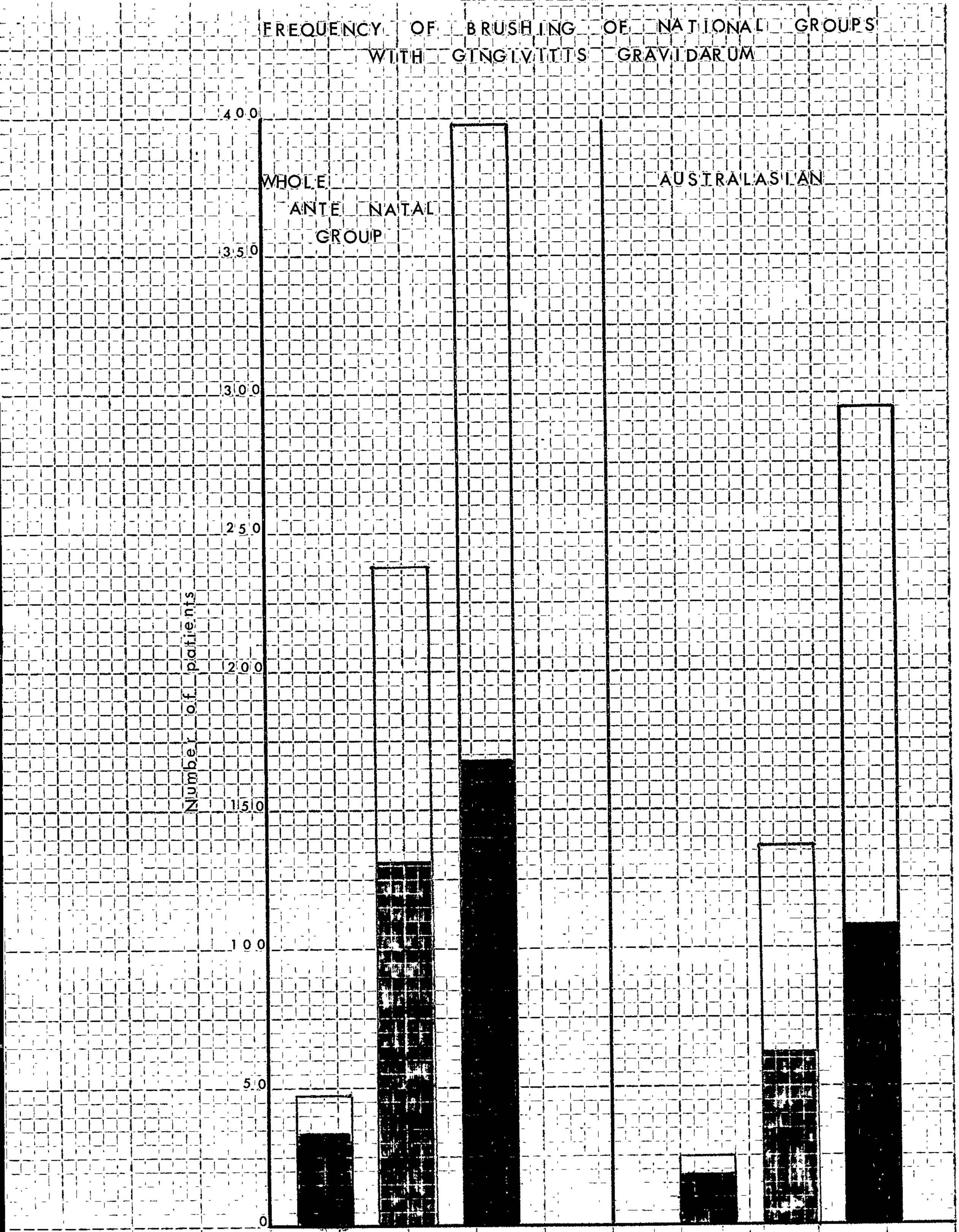


FIGURE VII

FREQUENCY OF BRUSHING OF NATIONAL GROUPS WITH GINGIVITIS GRAVIDARUM

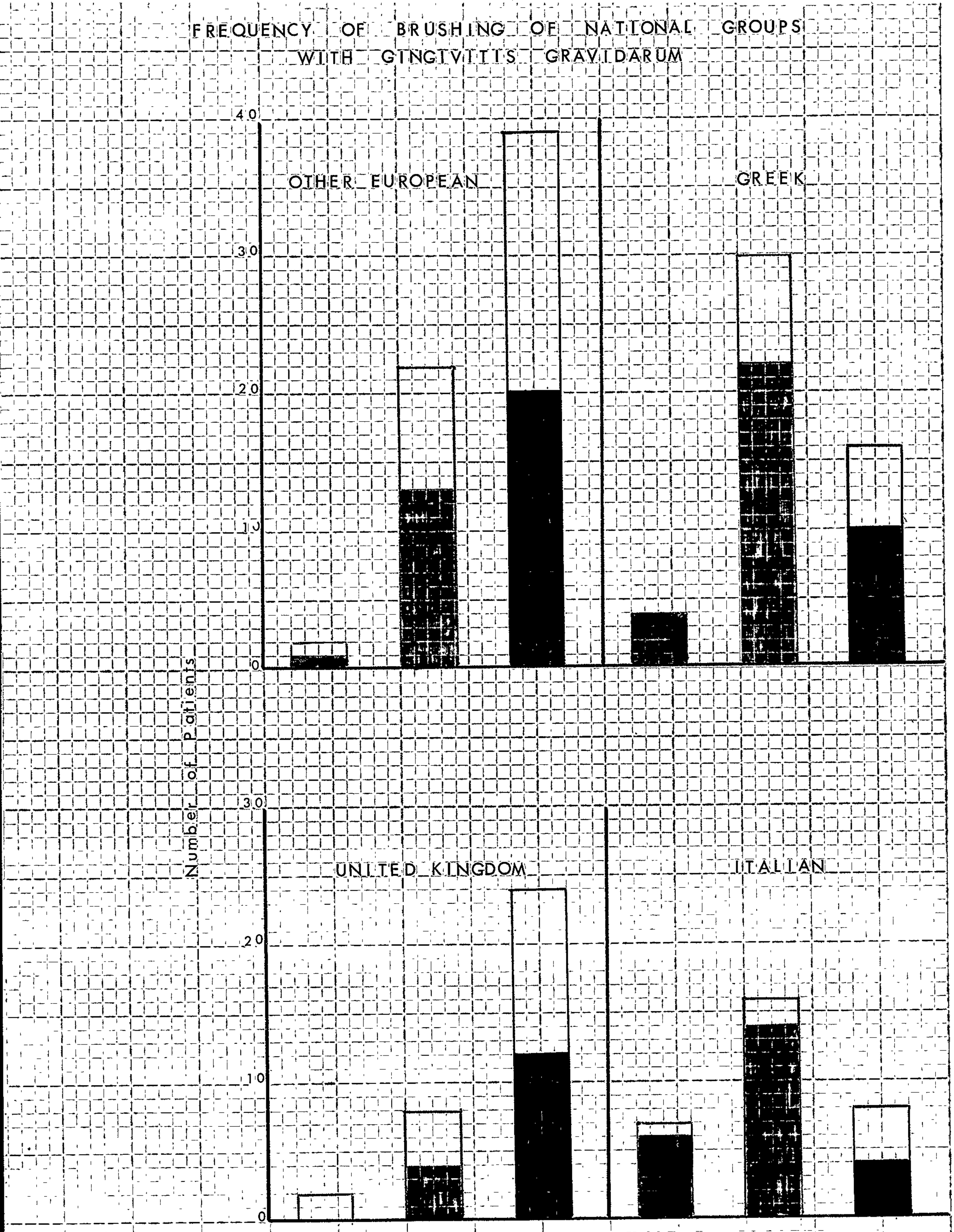


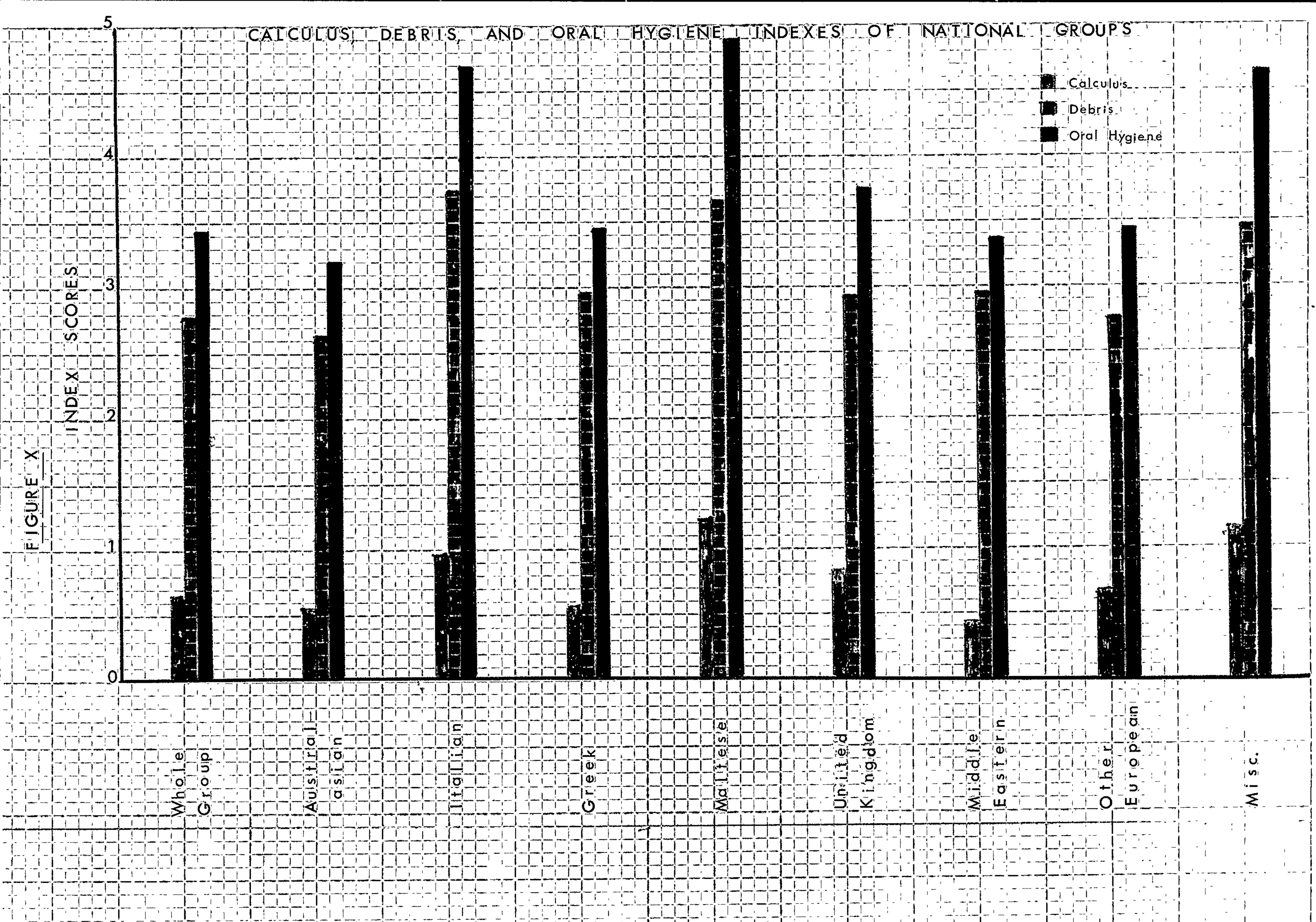
FIGURE VIII

FREQUENCY OF BRUSHING OF NATIONAL GROUPS WITH GINGIVITIS GRAVIDARUM

FIGURE IX

FIGURE X

CALCULUS, DEBRIS, AND ORAL HYGIENE INDEXES OF NATIONAL GROUPS



SCORING OF INDEXES FOR ANTE NATAL AND POST NATAL GROUPS

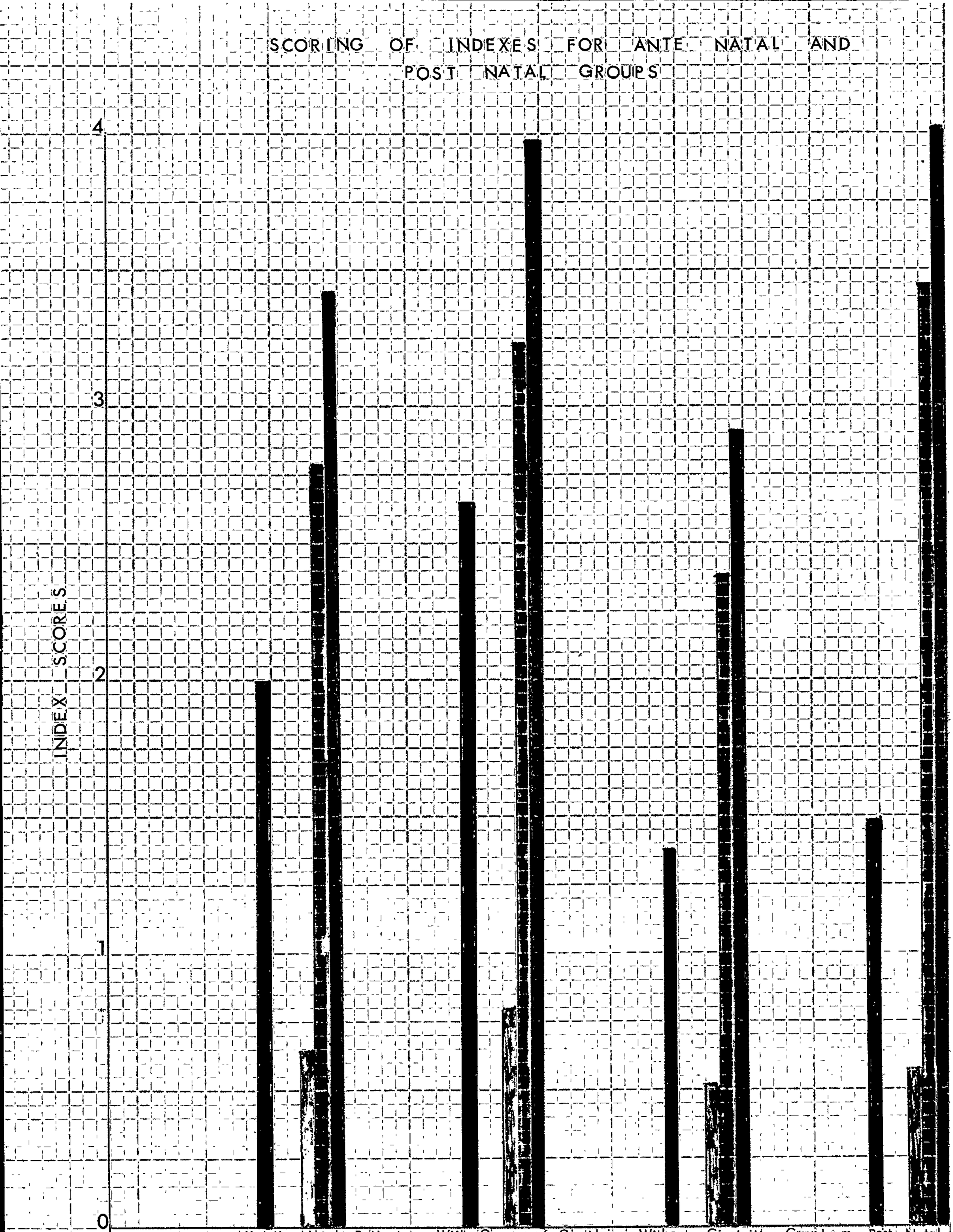


FIGURE XI

IV. SELECTED CASE HISTORIES.

1. Mrs. C., an Italian aged 32 years, was first seen at 28 weeks and was a primapara. She brushed her teeth twice daily and claimed that she had had no bleeding present, prior to about 12 weeks gestation.

When examined, she showed a marked hypertrophy around most of her teeth. All teeth were present. No calculus was visible with a light and none could be detected with a probe. The condition affected her mastication because of the bleeding, and there was some pain when food rubbed over the gums. From this period until delivery which was at 43 weeks, there was an increase of the hypertrophy both labially and lingually. This was more marked on the lower anteriors than elsewhere. Mrs. C. was seen several times during the pregnancy, and over the last weeks the bleeding became less as the enlargements increased.

The hypertrophy was not an isolated process, but was part of a generalised condition of proliferation. The margins of practically all the gingivae were swollen and hyperaemic and scarlet red in colour.

Generally, the patients at the hospital were not given dental treatment, but in this case, advice was sought on the

means of treatment. The patient was shown how to carry out improved gingival stimulation with a very soft tooth brush, but claimed that even this soft brush caused discomfort, although she did persevere.

Her mouth was examined five days after the birth, and at this stage showed some marked regression, although it was not complete. The bleeding had ceased completely, and there was no soreness.

Her medical history showed no serious illnesses, and her period of gestation, apart from being three weeks longer than usual, was uncomplicated. She was a normally developed woman, and well nourished, with, however, a national leaning toward a large amount of farinaceous material in her diet.

Because of this type of diet, and the inability to brush well, it is possible that these hypertrophied areas formed an ideal site for food impaction, and the collection of sordes which acted as constant irritants, with a resultant irritation of the condition.

2. Mrs. J., aged 19 years, was Australian and a primapara. She attended regularly for dental treatment and brushed her teeth three times daily. At her first examination at nine weeks, her Russell's Index was 0.25 with only

two upper first molars showing any periodontal condition.

When examined at twenty-five weeks her Russell's Index gave a score of 2.0 with a gingivitis around every tooth. There was considerable bleeding in the anterior region. Her Oral Hygiene Index had shown some increase. In both examinations there was no calculus detectable.

She was again examined at 37 wekks when there was a reduction in the Russell's Index to 1.75. All teeth still showed gingivitis, but the score on some teeth had dropped from 2 to 1, and there were fewer areas of bleeding.

3. Mrs. G., aged twenty-two years was an Australian and a primapara. She was seen at my surgery and attended regularly, every six months for treatment. Her brushing was twice daily.

When examined at sixteen weeks, she showed an oral condition no different from when examined before her pregnancy commenced. Her Russell's Index was 0.54 and her oral condition was very good. Although there were a few areas of gingivitis, there had been no bleeding from any of them.

When examined again at thirty-five weeks, there was bleeding from around the lower anterior teeth, the gingivae showing raspberry red gums. Her Oral Hygiene score remained

basically the same as at the previous examination,

4. Mrs. S., was also seen at my surgery. She was aged twenty-nine years, in her third pregnancy, and was Australian born. She attended for treatment every six to nine months. A jacket crown was present around the upper right lateral incisor.

When examined at thirteen weeks and thirty-three weeks, an inflammatory reaction had taken place around the gingival margin of the crown, and the area bled very easily. Although the crown had been in place for several years, it apparently did not cause any observable clinical irritation prior to the pregnancy. No other gingival area showed any reaction during the pregnancy. When examined four weeks post-natally, the inflammation had subsided and no bleeding was evident.

5. Mrs. A., an Australian was aged twenty-eight years. She was now in her eleventh pregnancy, her first child being born when she was sixteen. She only attended a dentist when she had pain. Her brushing was twice daily.

An examination was made at twenty-four weeks. The oral condition was poor, with roots remaining where the crowns of two teeth had decayed away. The Russell's Index was 3.05 and there was some gingivitis which appeared to be due to pregnancy super-

imposed on a long standing gingival distburbance.

At her next examination at 36 weeks, there was a deterioration of the condition, which now showed hypertrophy in areas which previously presented only bleeding or loss of stippling. The amount of bleeding had increased considerably. The patient stated that a similar occurrence took place with as many of her previous pregnancies as she could remember, and that post partum, the condition always disappeared.

6. Mrs. De. V., was an Italian, primapara, aged twenty-two years, who brushed her teeth twice daily. Although under treatment with a dentist at present, she only sought treatment when necessary.

When examined at ten weeks, there was some gingivitis present, but none that could be classified as due to pregnancy.

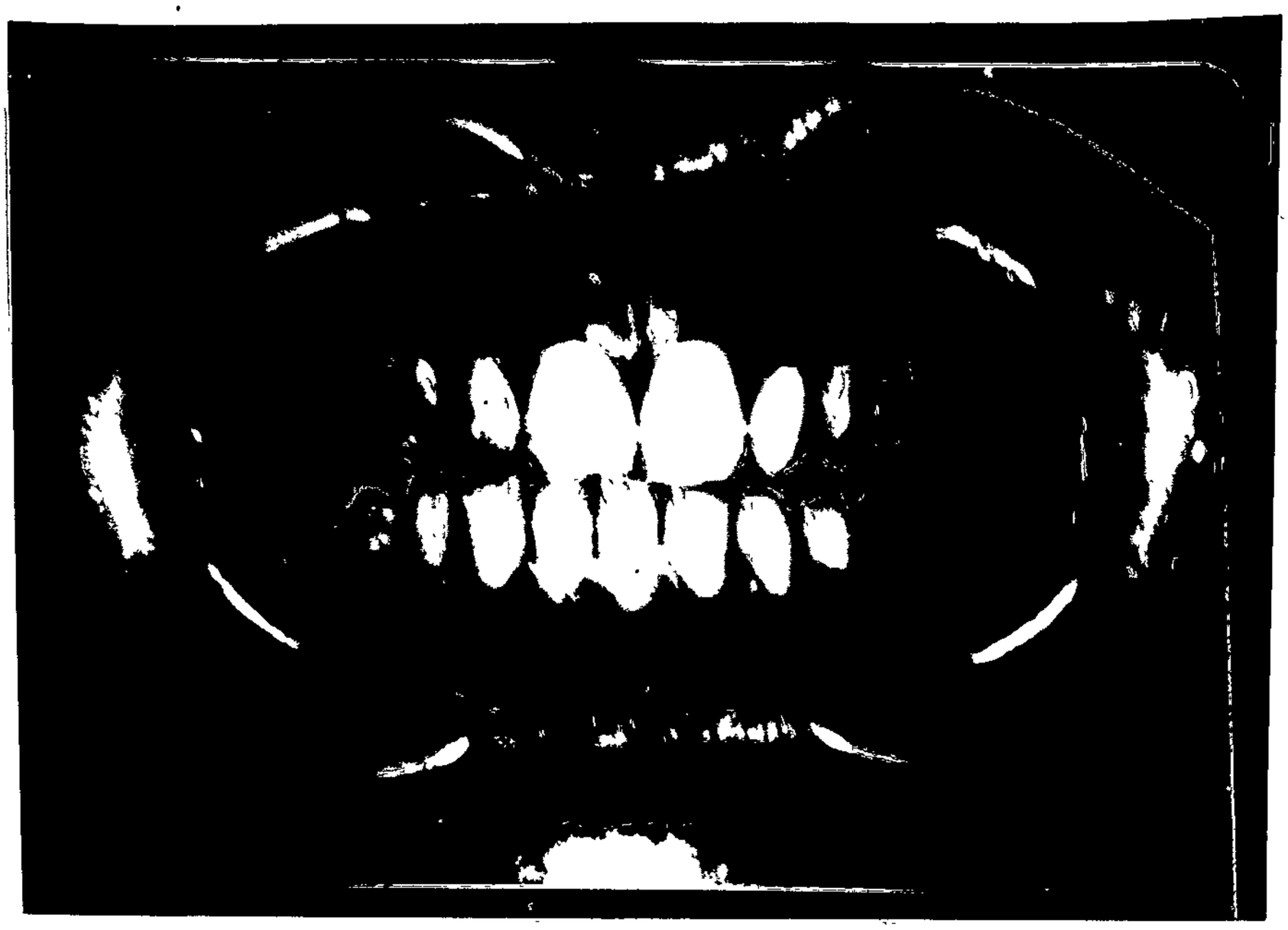
A further examination took place at twenty-four weeks, when more than half of her teeth showed gingival changes. There was a combination of Ziskin Class 2, Class 3 and Class 4. Her Russell's Index had increased from 1.2 to 3.21 and her Oral Hygiene Index had increased only slightly.

Another examination was made at thirty-six weeks. The Russell's Index was 3.32 and there was a slight increase in the gingival changes in certain areas showing more proliferation,

whilst others had remained the same. The Oral Hygiene Index was basically unchanged.

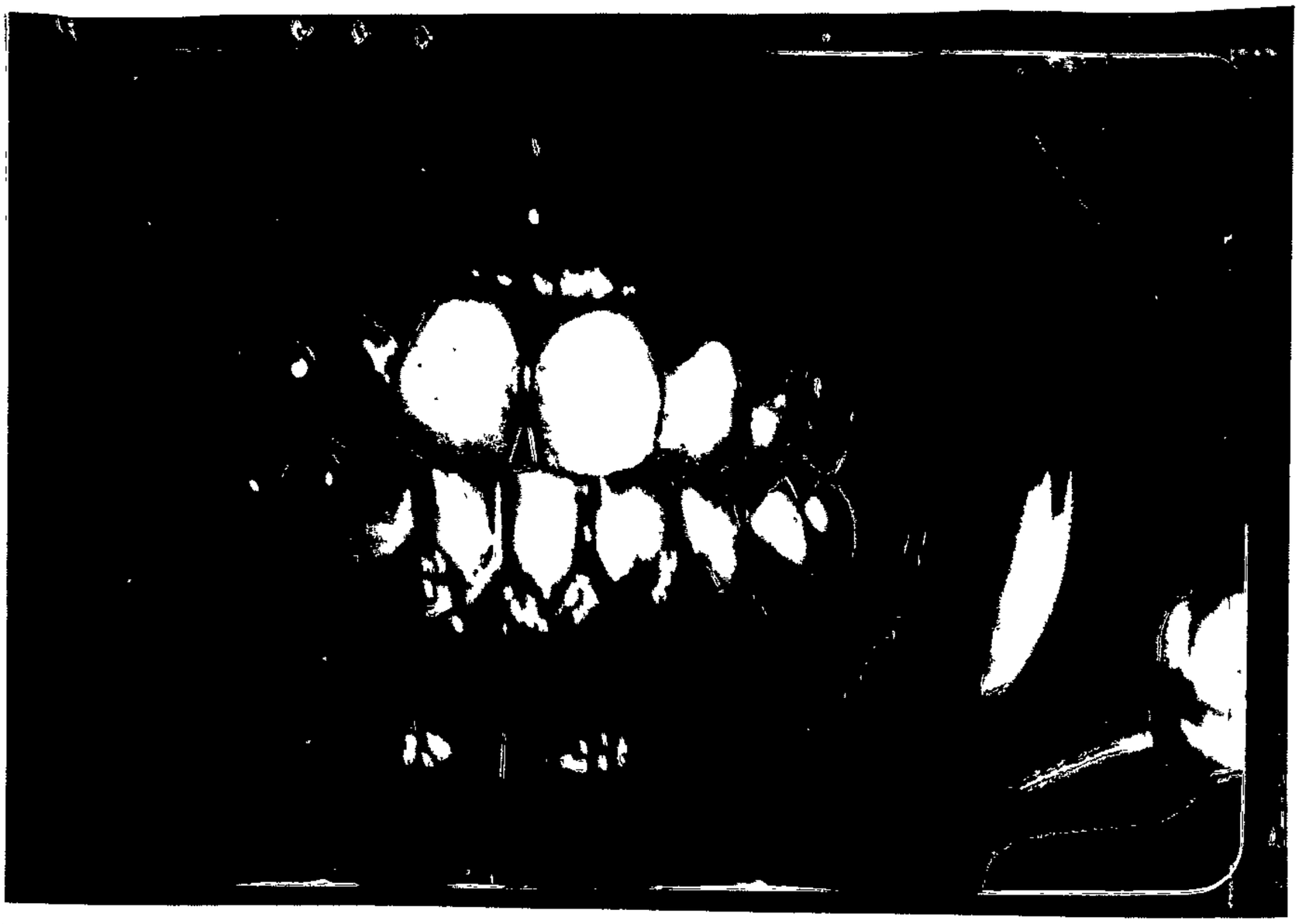
Photographs of typical examples of gingivitis gravidarum amongst the patients examined are illustrated.

Included is one of a multipara in an advanced stage of gestation, showing a completely normal gingiva.



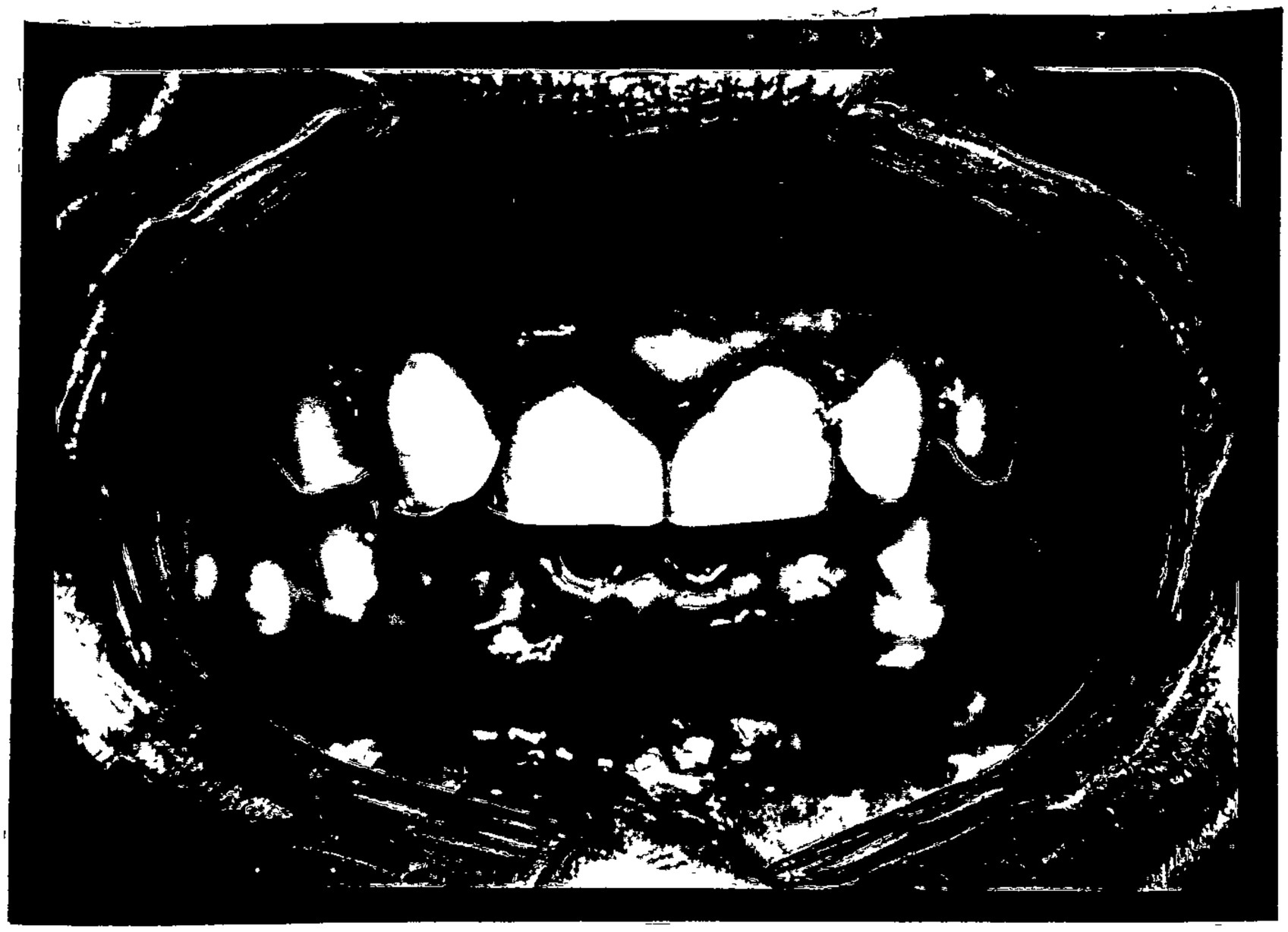
AUSTRALIAN AGED 21 YEARS, THIRD PREGNANCY,
BRUSHING THREE TIMES A DAY. 33 WEEKS GESTATION.
NORMAL GINGIVA.

AUSTRALIAN, AGED 25 YEARS, THIRD PREGNANCY, BRUSHING TWICE DAILY.
20 WEEKS GESTATION. BLEEDING AROUND LOWER LEFT FIRST & SECOND
PREMOLATS. PRESENT OVER SEVERAL WEEKS.



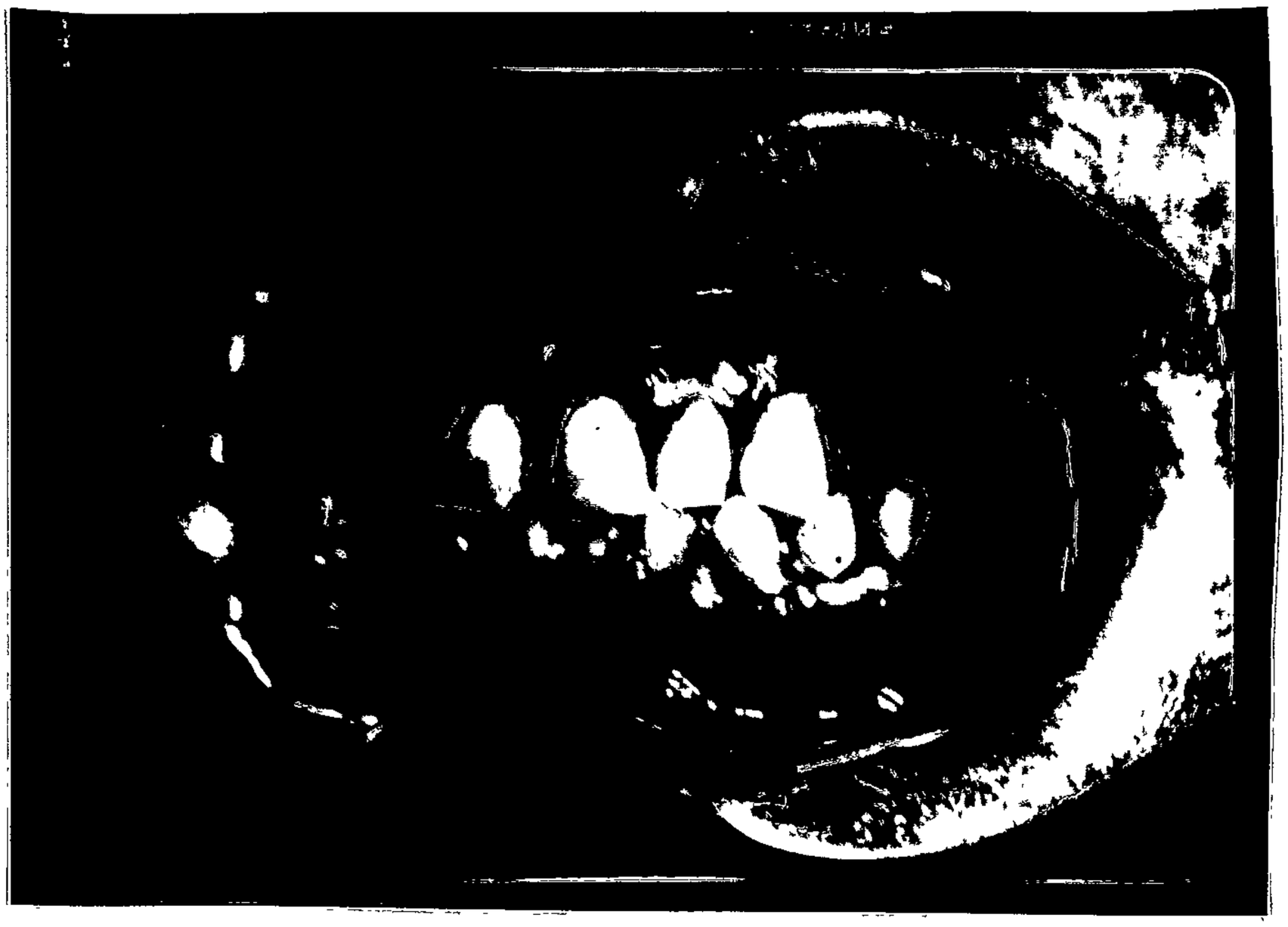
MALTESE, AGED 39 YEARS, 24 WEEKS GESTATION, BRUSHING TWICE DAILY. POOR ORAL HYGIENE. ADVANCED PERIODONTITIS BLEEDING AROUND LOWER ANTERIORS, ONLY PRESENT OVER LAST SIX WEEKS.

ENGLISH, AGED 20 YEARS, PRIMAPARA, 36 WEEKS GESTATION, BRUSHING ONCE DAILY. SMALL EPULIS GRAVIDARUM BETWEEN FIRST AND SECOND PREMOLARS.PRESENT ONLY DURING PREGNANCY PATIENT WAS UNCERTAIN OF EXACT TIME OF OCCURRENCE.

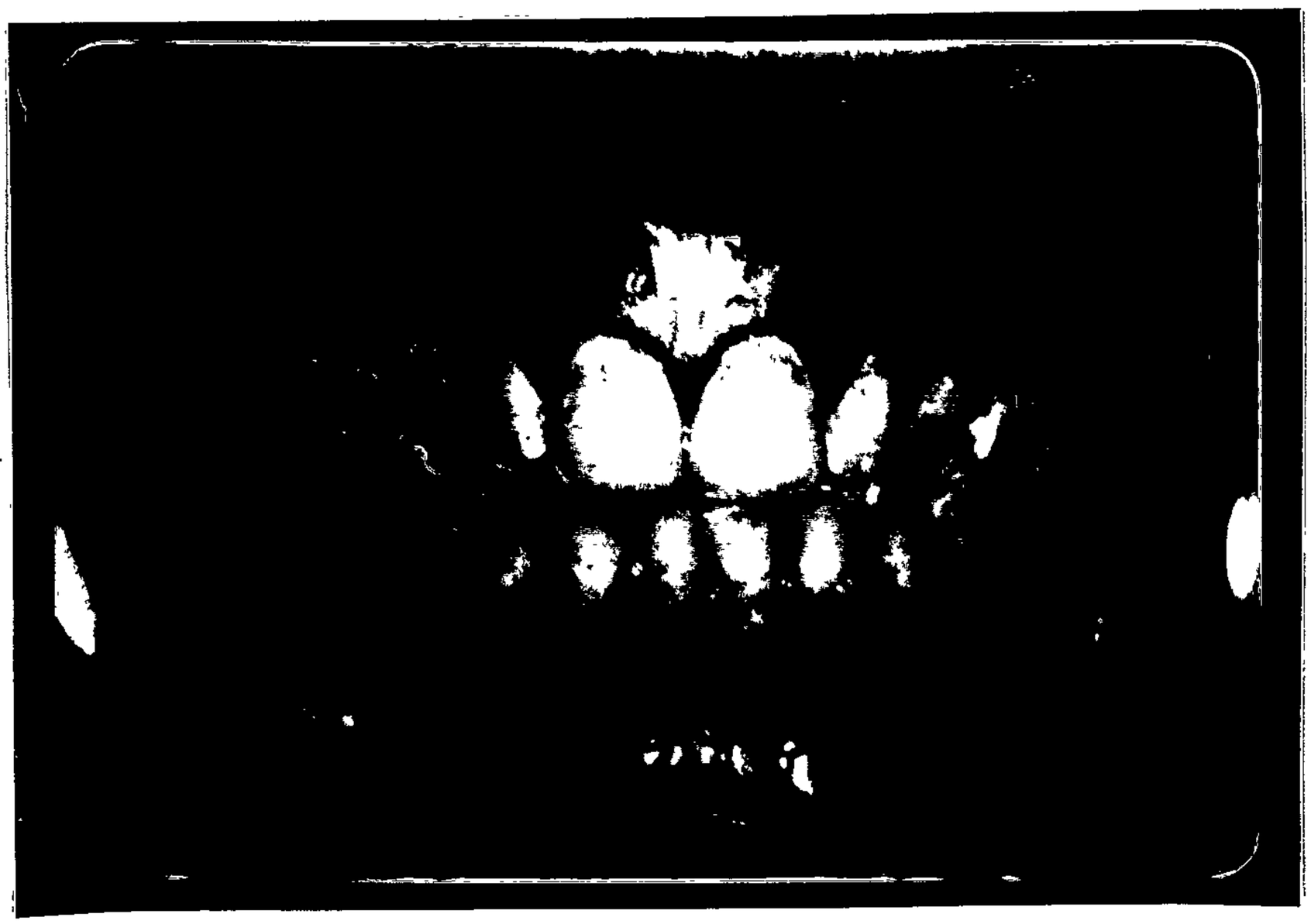


AUSTRALIAN, AGED 24 YEARS, PRIMAPARA, 20 WEEKS GESTATION, BRUSHING ONCE DAILY. SWELLING AND OEDEMA, LOSS OF STIPPLING, MAINLY AROUND ANTERIOR TEETH WHICH HAD INCREASED MARKEDLY OVER PREVIOUS SIX WEEKS.

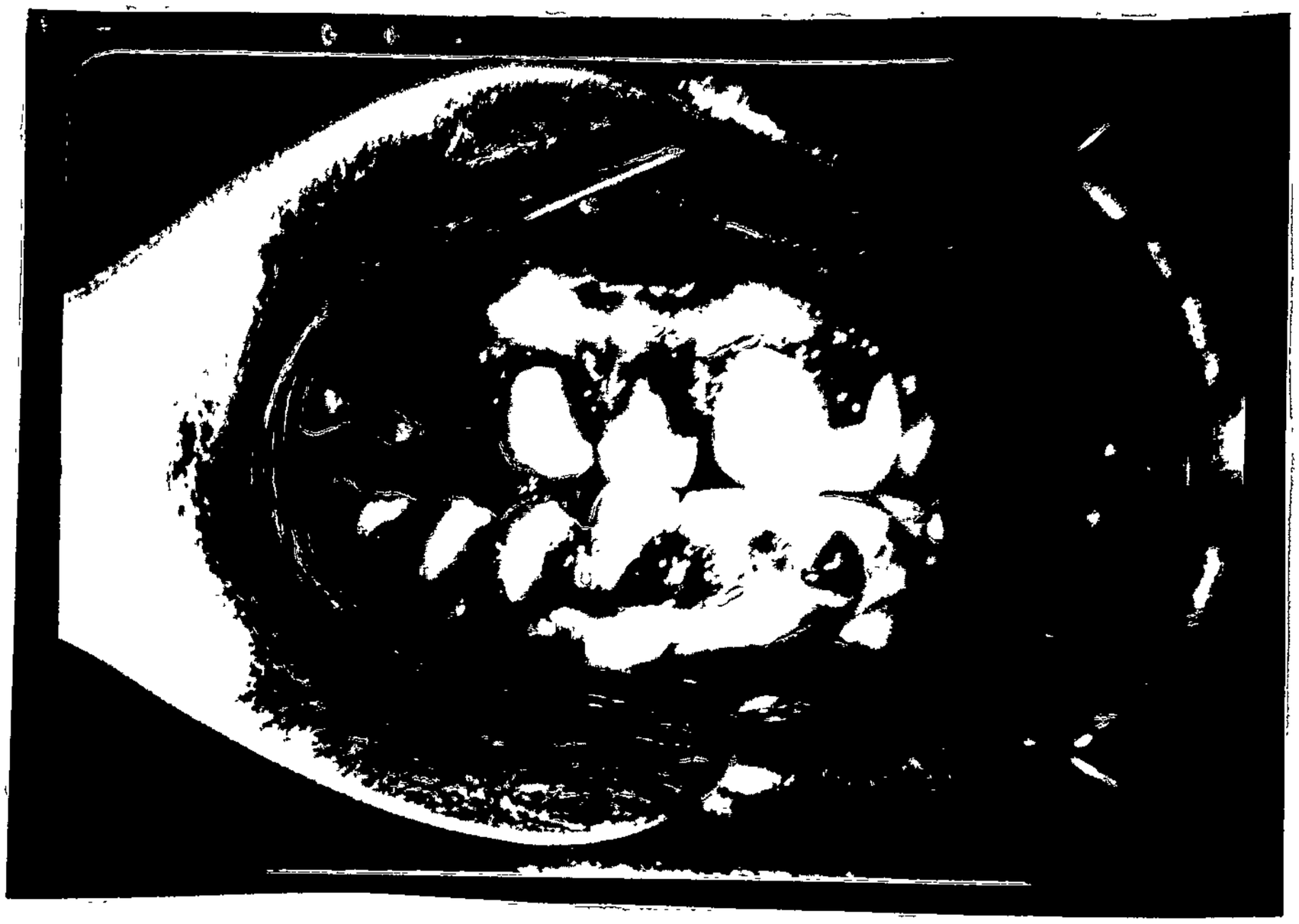
ITALIAN, AGED 19 YEARS, PRIMAPARA, 28 WEEKS GESTATION, BRUSHING LESS THAN ONCE DAILY. BLEEDING AROUND ANTERIOR TEETH AFTER COMMENCEMENT OF PREGNANCY.



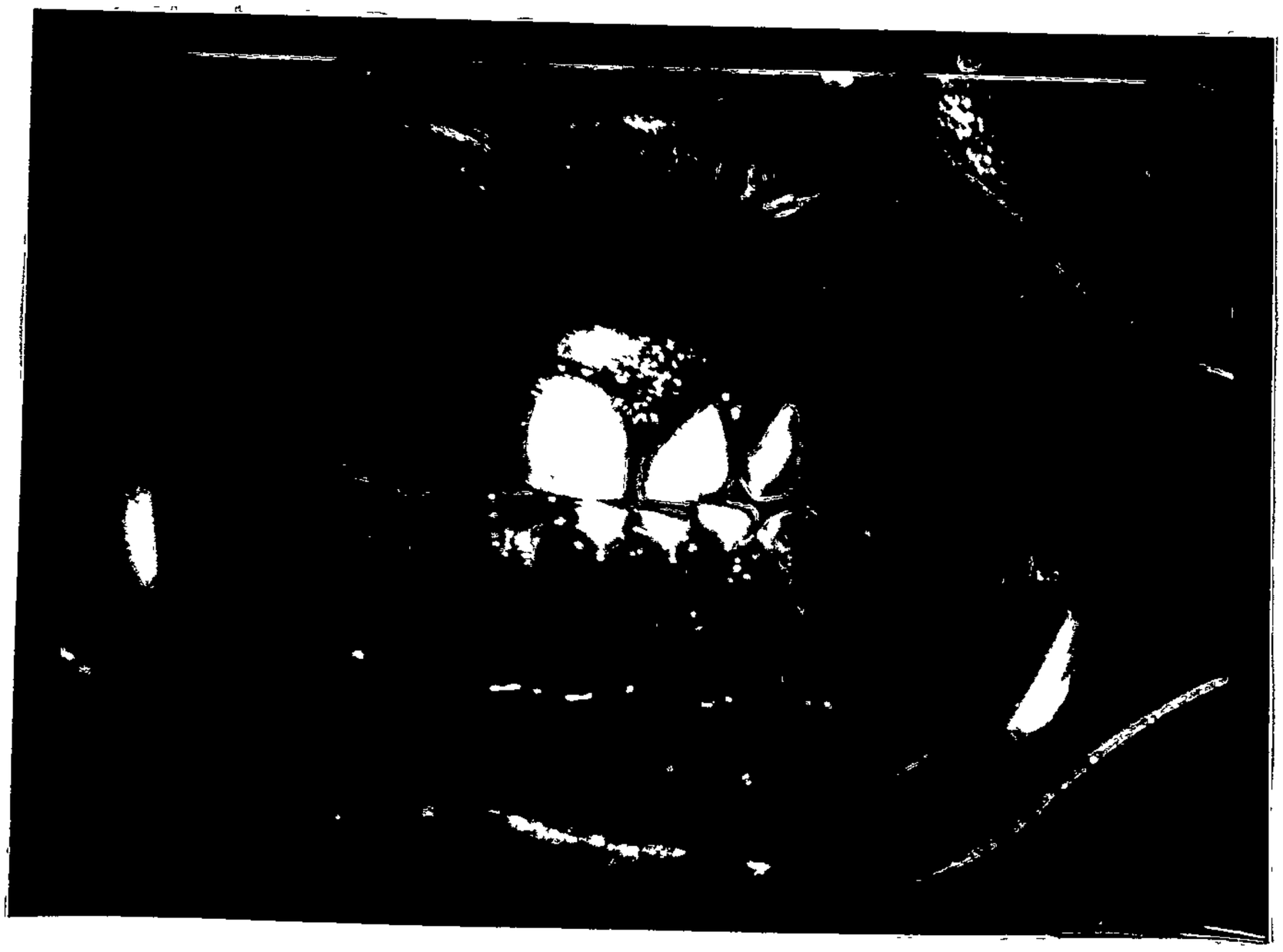
AUSTRALIAN, PRIMAPARA, AGED 32 YEARS, TEN WEEKS GESTATION. BRUSHING TWICE DAILY. INFLAMMATION AROUND MOST OF THE ANTERIORS WITH INFLAMMATORY SWELLING BELOW LOWER LEFT LATERAL AND CUSPID. PRESENT TWO WEEKS.



AUSTRALIAN, AGED 21 YEARS. SECOND PREGNANCY, 18 WEEKS. GESTATION, BRUSHING TWICE DAILY. "RASPBERRY RED"GUMS AROUND LOWER ANTERIORS. PRESENT FOR AT LEAST FOUR WEEKS.



ITALIAN, AGED 32 YEARS, PRIMAPARA, 32 WEEKS GESTATION, BRUSHING TWICE DAILY. MARKED HYPERTROPHY AROUND ALL TEETH. PRESENT THREE WEEKS.



SAME PATIENT, FORTY WEEKS GESTATION.

5. DISCUSSION

The oral tissues and teeth must be considered an intimate part of the human organism and the oral cavity is analagous to other body cavities with their associated organs. They are all governed by the same physiologic principles and the same physicochemical laws, with a common source of nutrition. As the oral tissues are in natural relation with the external environment and are subject to mechanical, chemical and bacterial insults that are rarely, if ever, experienced by other body cavities, they are unusually prone to disease.

These tissues are sensitive indicators of the general health status of the individual, and consequently changes in these structures are frequently the first indication of subclinical disease, processes or altered findings in other organ systems. This is particularly true of nutritional deficiencies, gastrointestinal disturbances, blood dyscrasias, certain anaemias and endocrine dysfunctions.(25)

This uniquness of the tissues of the oral cavity have made it an ideal field for research and investigation.

In this study it was possible to examine a group of women in all stages of gestation at the Women's Hospital, Crown Street, Sydney. The use of a portable dental chair and a small spot light

allowed me easy access to all departments. As many of the patients lived in outlying districts, they attend other clinics after the initial examination and do not return to this hospital until the last few weeks or the time of the actual confinement. This meant that it was not possible to follow through with second and third visits of as many patients as I would have desired. Although I was anxious to examine post natally many interesting ante natal patients, it was impossible to do so in most cases as, despite the routine appointment made for all confinements by the hospital, an extremely small number bother to attend, and the two cases of epulis were not seen post natally to ascertain whether there had been regression or not.

The six hundred and eighty-four ante natal patients examined formed a sufficiently representative group to determine the prevalence of gingivitis gravidarum. It must be emphasized that these patients were not selected, but were taken at random and examined, as they presented themselves at the hospital, with the exception of those who came from my own surgery, and who were all the pregnant women who came for treatment during the same period. No patient was rejected unless she was edentulous or possessed less than six teeth.

Most patients were apathetic towards dental examinations, particularly those with poor oral health and of those who were examined more than once, very few sought the treatment which had

been advised. In many cases, where I suggested that the patient consult her own dentist,I was informed later by the patient,that the practitioner was unwilling to treat her during her pregnancy. This unfortunate attitude from some members of the profession shows a complete lack of understanding of the condition and needs to be overcome.

Difficulty was sometimes experienced in obtaining all the information required where the migrant women did not have a full command of English. However, they were often accompanied by the husband or a friend who could interpret, and at other times an interpreter was available from the hospital staff.

The classification by Ziskin and Nesse[134] is possibly the best method available for identification of the various gingival disturbances in pregnancy, but it is by no means the ideal. Too much emphasis must be placed on the patient's information as to her gingival condition prior to pregnancy, and too much is left to the examiner's interpretation of any changes which may have taken place. There is no accurate means of measuring actual gingival change such as colour changes, commencement or increase in bleeding, or changes in volume. All gingival disturbances seen during the survey were covered by Ziskin's classification. The Class 5 of Ziskin and Nesse, which is an epulis, was retained, although Tiilila[111] does not agree that a typical epulis gravidarum is an exaggeration of gingivitis gravidarum.

I have discussed epulis under a separate section, but never

the less I have retained it as Class 5 for the purpose of comparison in this investigation. Because of the low prevalence of epulis gravidarum, percentages are misleading, and an impossibly larger number of pregnant women would be needed to get a true picture of the incidence. This is evidenced by Amies (2) who examined 1,700 pregnant women in all stages and did not find even one true case of epulis.

The gingivitis gravidarum encountered in these patients ranged from the localization of inflammation of a few gingival papillae, lack of stippling, raspberry red gums, generalised hypertrophy and finally to epulis. The prevalence of hypertrophic gingivitis did not appear to be as high in this survey as in some, such as Ziskin (133) who found 70% hypertrophic of all patients affected. Hilming, (55) noted a lower percentage. As a hypertrophic gingivitis in non-pregnant women may continue into pregnancy, one is not justified in diagnosing all such conditions as arising from pregnancy without further investigation.

Russell's Periodontal Index, whilst being suitable for determining the gingival state, was only partly effective in showing gingival changes in pregnancy. If a high score already existed around a tooth, there was no method of indicating a superimposed inflammation or hypertrophy. It was quite effective in comparing the gingival condition of the various groups and the ante natal and post natal groups.

The score for the Russell Index is heavily weighted for periodontal breakdown, but as gingivitis gravidarum does not affect the deeper tissues, this scoring method is only partially effective. It is necessary to differentiate between gingivitis in pregnancy and gingivitis attributable to pregnancy.

The examiner, in an investigation of this type is faced with five types of patients, namely: a) those who, prior to pregnancy evinced no signs of gingival disturbance, and who, during the pregnancy, showed no change, b) those who evinced no signs of gingival disturbance before pregnancy, and who developed a gingivitis during its course, c)those with a gingivitis before pregnancy, and showed no change during gestation, d) those with a gingivitis before pregnancy, and who showed a change in gingival condition during its course, and e) those with a gingivitis before pregnancy and who showed some special gingivitis during pregnancy.

To diagnose these conditions accurately, the examiner should have access to the patients prior to pregnancy. It can readily be appreciated that in a large scale investigation, this is an impossible prerequisite. What is needed is some means of actual measurement or a series of standardised photography, or, in short, a method which will show even small macroscopic changes. A patient may show a Ziskin Class 1 or 2 condition, for example, at her first visit, and at a later examination, may show an increase which still lies within the same

classification. Using the scoring of Russell or Ziskin there is no way of indicating this.

The Debris, Calculus and Oral Hygiene Indexes were a good indication of the oral state. Generally, the Oral Hygiene Index was related to the Periodontal Index. This was not true for the post natal group, where the Russell Index was lower, but the Oral Hygiene score was higher.

The number of pregnancies and the age of the mother had no bearing and gave no indication of being an etiological cause. This is confirmed by Gompertz,[43] and Mugnier.[78] This can also be compared with the work of Schour and Massler[100] in a survey of a non-pregnant group of 270 nurses, twenty to thirty-four years old. They found that there was no significant increase in the amount of gingivitis with an increase in age.

Ringsdorf, Powell, Knight and Cheraskin,[91] have shown that the twenty-five to thirty year olds have significantly less bleeding than the younger group. Erb and Brzezinsky,[31] found however, that their greatest prevalence was amongst the twenty-six to thirty year old of Israeli-born women, and twenty-one to twenty-five year old group among the immigrants.

Whilst it is not possible to state the time of onset of gingivitis in pregnancy, as it appears to vary greatly in each individual, it was observed in those examined more than once,

that there was a noteable increase during gestation, and many exhibited amelioration in the ninth month. This has also been noted by Hilming.(55)

The direct relationship between the frequency of brushing and the incidence of gingivitis gravidarum shows that the condition can be minimised by better oral hygiene. This alone is unlikely to prevent the condition, but it could be a major factor in controlling its severity. The brushing techniques of most of the patients left much to be desired.

Whilst some national groups exhibited a higher percentage of the condition, it did not appear to be due to any inherent physical condition. Rather was it a combination of poor oral hygiene and ingestion of a highly farinaceous diet. These particular people had not been in the country very long. Horsnell and Packer,(57a) however, found no significant difference in the Periodontal or Oral Hygiene Indexes between Australians and those of European origin. This was probably due to their selection of patients as they excluded those with limited English.

Russell,(94) has shown that periodontal disease, once present in an individual, is conditioned by his social background. People with better educational attainments tend to exhibit periodontal disease in the milder stages. This was also my observation in the course of examination with most of the patients from all

countries including Australia. The Italians, Maltese and Greeks exhibited a high percentage of gingivitis gravidarum and most of them came from the poorest areas of their countries.

Fraser [36] also noted a high incidence of the condition in the lower economic group.

From the patients studied and from the literature available, nutritional and vitamin deficiencies can generally be ruled out as a cause of the condition. It also appears that most local factors can be discounted as the only cause. Since the condition usually improves so rapidly after parturition without any treatment being carried out, and without any extra care being exercised by the patient, one must look for systemic causes, possibly hormonal, particularly as the local conditions remain the same except that the body has reverted to its non-gravid state.

A condition of gingivitis gravidarum has been discussed throughout this thesis and the patients divided into groups of those with and without the condition even though the ideal method of diagnosis and measurement has not been found.

At the present time the initiating cause of changes which often take place in the oral cavity during pregnancy is still uncertain. Although the results showed 48.7% of the women examined had gingivitis gravidarum, a more objective form of accurate diagnosis and measurement could give a different result.

It is practically impossible to differentiate between gingivitis of pregnancy and a simple gingivitis without the knowledge that the patient is pregnant or not.

Notwithstanding the limitations of the methods of diagnosis and measurement of gingival changes, a clinical impression remains that changes do take place in the oral cavity during the period of gestation, even though the assessment cannot be regarded as completely accurate. However, it is only to this extent that one is justified in saying that a gingivitis of pregnancy exists since there are no specific clinical and histopathologic changes in the gingiva which are exclusive to pregnancy.

SUMMARY AND CONCLUSION.

1. The subject of gingivitis in pregnancy has been discussed by many over the years. The conflicting thoughts regarding its etiology makes one realise that there is enormous scope for research in order to obtain more conclusive results.

2. An epidemiological study of six hundred and eighty four pregnant women and seventy five post natal patients was carried out in Sydney, and showed that there was a higher incidence of gingivitis in the pregnant group when scored by the Russell Periodontal Index.

3. The Russell Periodontal Index, whilst indicating the periodontal status of the gingival state of patients, is heavily weighted for more advanced periodontal disease and is not an adequate scoring method for assessing gingival changes during pregancy.

4. Until a more accurate means of diagnosing and scoring the gingival changes during pregnancy is found, and until a means is devised whereby groups of women could be examined before, during and after pregnancy, the present methods of measurement must be used, despite their shortcomings.

5. The observed clinical changes diagnosed as gingivitis gravidarum are not unique to pregnancy and can also be observed in the non-gravid state.

6. In the course of this survey of six hundred and eighty four pregnant women, three hundred and thirty three were diagnosed as having gingivitis gravidarum according to Ziskin's classification. As the diagnosis relies on information obtained from the patient, and leans heavily on the examiner's opinion as to what changes have occurred, these figures must be treated with some caution.

7. The Russell Periodontal Index of the 684 ante natal group was 2.00 and of these only 31 exhibited a score of zero. The post natal group of 75 had an Index score of 1.49.

8. In those diagnosed as gingivitis gravidarum, no statistical significance could be attributed to age, number of pregnancies or weeks of gestation, although there was some diminution of the condition in the ninth month.

9. The frequency of brushing was directly related to the incidence of the gingivitis, showing that those who brushed more frequently were less inclined to suffer from the condition.

The Greek, Maltese and Italian groups exhibited the highest incidence of gingivitis and these were the groups which brushed less frequently.

10. No clinical test was carried out as to the part played by hormonal changes during pregnancy, but a full revue of the pertinent literature has been included.

11. There were no obvious cases of nutritional deficiency amongst these patients, but the highly farinacous diet of some groups did appear to cause irritation due to deposited debris.

12. The importance of local factors in gingivitis in pregnancy cannot be minimised but the role played by systemic disturbances due to changes in hormonal balance must be considered. Obviously, no single factor is responsible for the onset and continuance of this condition. As the result of an altered functional and regulatory mechanism of the body following the implantation of the ovum, it is possible that hormonal changes could cause exaggerated tissue changes in those mouths where local factors are already present.

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