Clinical Tooth Mobility and Pregnancy

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CLINICAL OPINION has it that tooth mobility may be more obvious during gestation than in the nonpregnant state. However, there is a paucity of published material on this subject. This report will attempt to clarify the relationships between gestation and clinical tooth mobility.

Very little specific information is available with respect to the relationship of clinical tooth mobility and pregnancy. Muhlemann measured tooth mobility with his periodontometer. By this method he indicated that during the latter months of gestation, the teeth become increasingly, though subclinically, more mobile. However, the periodontometric procedure is not readily suited to clinical practice.

METHOD OF INVESTIGATION

Three hundred and sixty-three pregnant and postpartum patients were studied in five obstetric clinics in Birmingham, Ala. The general plan of the study has been described.[3]

A record was kept of the number of months of pregnancy to the half month. These data have been summarized by trimesters in Table 1. It may be observed that 90.16 per cent of the patients were pregnant, and the remainder were postpartum. In addition, the great majority of pregnant patients were observed during the third trimester.

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TABLE 1. DISTRIBUTION OF PREGNANCY STATE

	Patients	
	No.	*%*
Pregnant	330	90.16
1st trim.	15	4.09
2nd trim.	120	32.78
3rd trim.	195	53.27
Postpartum	36	9.83
TOTAL	366	100.00*

* Approximate.

Tooth mobility was graded on a three-point scale (no clinical tooth looseness, slight, and severe clinical tooth mobility). Four patients were unrecorded. Table 2 shows the frequency distribution of the 363 patients in terms of degree of tooth mobility. Most patients (93.44 per cent) showed no evidence of clinical tooth mobility.

RESULTS

The results will be considered under two categories: (1) general characteristics and (2) subgroup analyses.

TABLE 2. DISTRIBUTION OF CLINICAL TOOTH MOBILITY

Degree of tooth mobility	Patients	
	No.	*%*
None	342	93.44
Slight	15	4.09
Severe	2	0.54
Unrecorded	4	1.09
TOTAL	363*	100.00†

* Three edentulous patients excluded.
† Approximate.

General Characteristics

Table 3 summarizes the relationship of clinical tooth mobility and pregnancy. The mean tooth mobility score for the entire pregnant group was 0.06, with a standard deviation of 0.26. In contrast, not one of the 34 postpartum patients showed clinical tooth mobility. The significance of the difference of the means is clearly spelled out by the probability value of $p < .001$. Thus, during gestation, one is much more likely to encounter clinical tooth mobility than in the postpartum period.

TABLE 3. CLINICAL TOOTH MOBILITY AND PREGNANCY STATE*

	Pregnant	*Postpartum*	p
No.	325	34	
Mean tooth mobility scores and standard deviation	0.06 ± 0.26	0.00 ± 0.00	< .001

* Four patients unrecorded.

Subgroup Analyses

Though there is a significant difference in clinical tooth mobility between the pregnant and postpartum groups, this distinction cannot be interpreted in terms of a cause-and-effect pattern. In other words, these data do not demonstrate that pregnancy causes clinical tooth mobility.

The question arises as to whether other factors might provide some clue as to the mechanisms in the relationship between gestation and clinical tooth mobility. Accordingly, subgroup analyses have been made for circumstances that may conceivably contribute to clinical tooth mobility by means of local, systemic, and local and systemic means.

LOCAL FACTORS. A number of local factors have been indicated as contributors to the etiology of clinical tooth mobility.[4, 5, 10, 11] Some of these have been investigated in this study. Consideration will be given to 3 items: brushing of teeth, periodontal status, and number of teeth.

Brushing. There is evidence indicating that periodontal status is a function of oral hygiene and, therefore, of brushing.[10] Since tooth mobility is related to periodontal status, it was thought advisable to analyze the pregnant patients in terms of brushing. This information is summarized in Table 4. Though there is a mean difference between pregnant patients who did and those who did not brush their teeth, the probability factor ($p > .200$) indicates that there is no statistically significant difference between these groups. In other words, brushing of teeth is not a factor related to clinical tooth mobility.

TABLE 4. CLINICAL TOOTH MOBILITY AND PREGNANCY STATE IN THE LIGHT OF POSSIBLE LOCAL ETIOLOGIC FACTORS

Factor	*No. of pregnant subjects*	*Mean tooth mobility scores and S.D.*	p
No brushing	20	.100 ± .436	
Brushing*	26	.000 ± .000	> .200
PMA			
Zero	92	.000 ± .000	
Positive†	21	.363 ± .607	< .010
No. of teeth			
20–29	296	.043 ± .043	
10–19	26	.192 ± .404	> .050

* Three or more times per day.
† 2.0 or greater.

Periodontal Status. Many investigators hold that periodontal status is largely, if not exclusively, a function of local factors. Also, it is held by many investigators that clinical tooth mobility is related in some way to periodontal status.[5] Therefore, the pregnant patients were classified into two groups. The first category includes those patients with a perfect mouth as indicated by a PMA of zero. In contrast, those subjects with an average PMA index of 2.0 or greater were grouped to depict obvious periodontal pathosis. Table 4 shows that there is a statistically significant difference ($p < .010$) between these groups. In other words, clinical tooth mobility is much greater among pregnant patients who also show other evidence of periodontal pathosis.

Number of Teeth. There is some evidence indicating that periodontal status is related to the number of teeth.[4, 11] It would therefore seem possible that clinical tooth mobility might also conceivably be related to the number of teeth. In view of this, the pregnant subjects were grouped according to whether they had 10–19 or 20–29 teeth. Table 4 shows that tooth mobility is not statistically significant in the patients with relatively few or many teeth.

SYSTEMIC FACTORS. A host of systemic factors have been reported as possible agents in the etiology of clinical tooth mobility.[6, 7, 9] Some of these have been investigated in this survey. Consideration will be given to: trimester analyses, gravidity, citrus intake, and vitamin supplementation.

Trimester Analyses. Table 5 shows an analysis of the relationship of clinical tooth mobility to the gestation trimester. On a mean basis, there were decreasing tooth mobility scores with increasing pregnancy. However, a statistical analysis of all possible trimester combinations discloses that there was no statistically significant difference during gestation.

Gravidity. There is some evidence indicating that, with increasing gravidity, there was increasing clinical tooth mobility. Table 5 shows an analysis of pregnant primigravidas versus multigravidas. The mean tooth mobility score for the multigravida group was 1½ times greater than that for the primigravidas. There is also a statistically significant difference between the groups ($p < .001$).

Citrus Intake. The statement appears in the literature that tooth mobility is related to ascorbic acid status.[6, 7, 9] Further, there is general agreement that there is a positive correlation between orange juice intake and ascorbic acid status. Accordingly, the pregnant patients with no citrus intake were compared with those with citrus consumption (Table 5). On a mean basis, tooth mobility was almost twice as great in the group with no citrus consumption. There was a statistically significant difference, as shown by a p value of $<.001$.

TABLE 5. CLINICAL TOOTH MOBILITY AND PREGNANCY STATE IN THE LIGHT OF POSSIBLE SYSTEMIC ETIOLOGIC FACTORS

Pregnancy state and etiologic factor	*No. of pregnant subjects*	*Mean tooth mobility scores and S.D.*	p
Trimester			
1st	15	.13 ± .29	> .200
2nd	119	.06 ± .06	
1st	15	.13 ± .29	> .200
3rd	191	.05 ± .05	
2nd	119	.06 ± .06	> .200
3rd	191	.05 ± .05	
Primigravida	76	.039 ± .039	< .001
Multigravida	249	.064 ± .060	
No citrus intake	183	.071 ± .071	< .001
Citrus intake	141	.042 ± .042	
No vitamins	298	.066 ± .066	< .001
Vitamins	24	.000 ± .000	

Vitamin Supplementation. Twenty-four individuals took multivitamin pills 1–3 times daily. An analysis of the pregnant patients with no vitamin supplementation versus those with vitamin supplementation disclosed a great mean difference. As a matter of fact, not one of the pregnant individuals with vitamin supplementation showed clinical tooth mobility. It is clear that there is a statistically significant difference here ($p < .001$).

LOCAL AND SYSTEMIC FACTORS. There are some factors that may be regarded as etiologic agents of clinical tooth mobility.[1, 2, 8, 13, 14] However, the action may be either systemic or local. Two such items—age and race—were studied.

Age. It is generally held that tooth mobility is greater in older age groups. Hence, the subjects in this survey were divided into two categories on the basis of age. The mean tooth-mobility score for the older age group is approximately half again as great as for the younger group (Table 6). However, there is no statistically significant difference ($p > .200$) of the means.

Race. Table 6 shows that tooth mobility in the Caucasian group is approximately three

TABLE 6. CLINICAL TOOTH MOBILITY AND PREGNANCY STATE IN THE LIGHT OF POSSIBLE LOCAL AND SYSTEMIC ETIOLOGIC FACTORS

Factor	*No. of pregnant subjects*	*Mean tooth mobility scores and S.D.*	p
10- to 29-yr.-old patients	267	.052 ± .052	
30- to 49-yr.-old patients	58	.086 ± .304	> .200
Negro	224	.031 ± .031	
Caucasian	101	.108 ± .297	< .010

*Twenty or more daily.

times as great as in the Negro subjects. Further, on the basis of a p value of $<.010$, it seems that clinical tooth mobility is much greater in white subjects. Whether this can be traced directly to a racial difference or whether different races are characterized by different local environments cannot be established from these data.

DISCUSSION

There is no question but that there is a definite relationship between clinical tooth mobility and the pregnancy state. The evidence derived from this study indicates that there is a much greater possibility that there will be clinical tooth mobility during gestation than during the postpartum period. It is certainly worthy of note that not one of the postpartum patients had clinical tooth mobility. Although these facts do not establish that one of these factors is cause and the other effect, the possibility does exist that pregnancy may be the cause, or one of the causes, of clinical tooth mobility.

It is known that a number of local and systemic agents can contribute to clinical tooth mobility. Some of these factors have been investigated in this survey. Of the three possible local etiologic factors (brushing of teeth, periodontal status, and number of teeth), only the PMA index correlates with clinical tooth mobility. In other words, the patients with the worst periodontal status (as measured by the PMA index) show the greatest clinical tooth mobility.

A number of variables that conceivably may operate systemically to alter tooth mobility were also studied, including the gestation trimester, gravidity, citrus consumption, and multivitamin supplementation. Of these factors, a distinct and significant relationship can be demonstrated between these patients with and without vitamin supplementation, primi- versus multigravida, and citrus consumption as against no citrus intake. Those multigravidous pregnant individuals without additional vitamins and no citrus intake show greater tooth mobility than the primigravidas with vitamin supplementation and citrus consumption. In fact, not one of the pregnant patients taking additional multivitamins had clinical tooth mobility. Finally, several factors that may operate either locally or systemically in the genesis of clinical tooth mobility were also studied. Specifically, age and race were analyzed. It is of interest that a statistically significant difference in clinical tooth mobility was demonstrated in the Negro versus the Caucasian group, namely that clinical tooth mobility was much greater in the white than in the colored patients.

There is reason to believe that clinical tooth mobility may actually be multicausal in origin. That is to say, probably more than one factor determines whether the teeth are loose. Examination of all the possible combinations of factors studied shows that pregnancy, race, periodontal status, vitamin supplementation, citrus intake, and gravidity are all intimately associated with clinical tooth mobility. If any one factor appears to be dominant, it is vitamin supplementation, since patients given it showed no clinical tooth mobility.

It appears from these data that pregnancy and vitamin supplementation are important factors. These items are certainly of a systemic nature. There is evidence indicating, on the basis of this study, that the periodontal status also may modify clinical tooth mobility. Lastly, there is no question but that clinical tooth mobility is greater in white in-

dividuals. All these considerations suggest a combination of systemic and local factors.

SUMMARY

1. Three hundred and sixty-three pregnant and postpartum patients were studied in five obstetric clinics in Birmingham, Ala.

2. A definite relationship is demonstrated between pregnancy and clinical tooth mobility: whereas the pregnant group shows clinical tooth mobility, not one of the postpartum patients had this finding.

3. The status of the periodontium appears to be related to clinical tooth mobility.

4. It is clear that patients without vitamin supplementation showed clinical tooth mobility. In contrast, not one of the patients taking additional vitamins had clinical tooth mobility.

5. It appears that white individuals showed significantly more clinical tooth mobility than the Negroes.

6. Clinical tooth mobility may well be the result of the interplay of a host of factors.

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REFERENCES

1. ARNO, A., SCHEI, O., LOVDAL, A., and WAERHAUG, J. Alveolar bone loss as a function of tobacco consumption. *Acta odont. scandinav. 17*:3, 1959.
2. ASGER, F., and PINDBORG, J. J. Tobacco and gingivitis: III. Difference in the action of cigarette and pipe smoking. *J. Dent. Res. 28*: 464, 1949.
3. CHERASKIN, E., FLYNN, F. H., HUTTE, A. C., FESS, L. R., HUFFSTUTLER, B. B., and BOCKLER, C. E. The Alabama study of maternal ascorbic acid nutrition. I. General information. *Ala. Dent. Rev. 13*: Spring, 1960.
4. DREIZEN, S., STONE, R. E., and SPIES, T. D. Oral manifestations of nutritional disorders. *Dent. Clin. North America,* 429, July, 1958.
5. FORSBERG, A., and HAGGLUND, G. Mobility of teeth as a check of periodontal therapy. *Acta odont. scandinav. 15*:305, 1958.
6. HAMBLEN, T. N. The effects of pregnancy on the soft tissues of the mouth. *J. Dent. Med. 2*:12, 1947.
7. HICKS, H. Excessive citrus juice consumption. II. Clinical observations of its effect on superficial and deep tissues of the oral cavity. *Oral Surg. 4*:858, 1951.
8. LEWIS, A. B. Effects of smoking on the oral mucosa. *Oral Surg. 8*:1026, 1955.
9. LINGHORNE, W. J., MCINTOSH, G., TICE, J. W., TISDALL, F. F., MCCREARY, J. F., DRAKE, T. G. H., GREAVES, A. V., and JOHNSTONE, W. M. The relation of ascorbic acid intake to gingivitis. *J. Canad. Dent. A. 12*:49, 1946.
10. LOVIDAL, A., SCHEI, O., WAERHAUG, J., and ARNO, A. Tooth mobility and alveolar bone resorption as a function of occlusal stress and oral hygiene. *Acta odont. scandinav. 17*:3, 1959.
11. MESROBIAN, A. Z. Gingival bleeding. *Mass. Dent. Soc. J. 8*:9, 1959.
12. MUHLEMANN, H. R. Periodontometry, a method for measuring tooth mobility. *Oral Surg. 4*:1220, 1951.
13. PINDBORG, J. J. Tobacco and gingivitis. I. Statistical examination of the development of ulceromembranous gingivitis and in the formation of calculus. *J. Dent. Res. 26*:261, 1947.
14. PINDBORG, J. J. Tobacco and gingivitis. II. Correlation between consumption of tobacco, ulceromembranous gingivitis and calculus. *J. Dent. Res. 28*:460, 1949.