Recurrence and Tooth Mobility Associated with Gingival Enlargements in Patients Attending a Tertiary Hospital in Lagos, Nigeria

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Abstract:  
Background: Gingival enlargements has attracted much review in literature, however sequelae such as recurrence and tooth mobility and associated factors demands more research attention.  
Objective-This study assessed the prevalence and distribution of recurrence and tooth mobility associated with gingival enlargements and their predisposing factors in Lagos, Nigeria.  
Methods-This is a retrospective study of 138 patients seen over 5 years at the Dental Centre of the Lagos state University Teaching Hospital Ikeja, Lagos, Nigeria. Records were accessed from the Oral Pathology and medical records department of the same institution. SPSS 21 was used for data analysis; descriptive statistics was carried out for both continuous and categorical variables. Chi square and fisher’s exact were carried out as appropriate and logistic regression was used to test the covariates. Significance was determined at p≤0.05.  
Results- Prevalence of recurrence and tooth mobility was 26.8% and 39.1% respectively. Tooth mobility was highest among the 31-40-year-olds while recurrence was commonest in the 21–40-year-olds. Maxillary anterior sextant and the buccal/labial location were commonest sites for recurrence and tooth mobility. Pyogenic granuloma has the highest prevalence of tooth mobility (50%) and recurrence (67.6%). There is significant relationship between the dependent variables and tooth malpositioning and oral hygiene(p<0.05).Logistic regression reveals significant relationship between tooth mobility and recurrence, poor oral hygiene, tooth malpositioning, age and medications (p<0.05). Recurrence has statistical significance with educational level, poor oral hygiene, tooth mobility and malpositioning (p<0.05).  
Conclusion- Poor oral hygiene and tooth malpositioning were factors significantly associated with both recurrence and tooth mobility recorded with gingival enlargements in this study. This emphasizes the need for improvement in oral hygiene and early institution of orthodontic interception to correct malposed teeth in preventing these sequelae in patients that develops gingival enlargement.

Keywords: Gingival, recurrence, malpositioning, mobility, enlargement

1. Introduction  
Gingival enlargements (GE) are overgrowths usually slow growing lesions commonly found on the marginal or attached gingiva or both arising from interdental papilla or the facial tissues [1]. A large proportion of these lesions are initiated by exposure to chronic irritation and low-grade trauma from sub gingival plaque and calculus, tobacco smoking, irregular or sharp margins of carious or fractured tooth/fillings and friction from ill-fitting dentures and faulty restorations [1-5]. In females, this irritation is further aggravated by the effect of oestrogen and progesterone [1-5]. GE are...
Buccal gingiva is the commonest site of occurrence while distribution on maxilla and mandible is similar. Complications associated with gingival enlargement may include retained primary teeth, delayed eruption of permanent teeth, increased distal spacing, poor plaque control, poor mastication, affected speech, esthetics, and malocclusion. Recurrence is characteristic of Juvenile ossifying fibroma and Pyogenic granuloma. In a study by Effiom et al, Pyogenic granuloma was the most common lesions constituting 57%, of which pregnancy induced accounted for 9.5%, fibroepithelial hyperplasia and peripheral ossifying fibroma were 14.3% and 10.7% respectively. The female-to-male ratio ranged from 1.7:1 to 2.5:1 from different studies. The lesions are most prevalent in the second to the third decade of life and least common in the 7th decade and above. Buccal gingiva is the commonest site of occurrence while distribution on maxilla and mandible is similar.

2. Objective
This study determined the prevalence and distribution of recurrence and tooth mobility associated with gingival enlargements in patients attending the Periodontology clinic of the dental Centre, Lagos University Teaching Hospital (LASUTH) Ikeja Lagos. It also assessed associated factors of recurrence and tooth mobility in these patients.

3. Methods
This is a retrospective cross-sectional study of 138 patients seen over 5 years at the Dental Centre of LASUTH, Ikeja, Lagos, Nigeria. Convenient sampling method was used, records were accessed from the Oral Pathology and medical records departments of the same institution. The mouth was divided into sextants viz; upper anterior sextant (UAS), upper left posterior sextant (ULPS), upper right posterior sextant (URPS), lower anterior sextant (LAS), lower left posterior sextant (LLPS), lower right posterior sextant (LRPS). Lesions included in the study were Pyogenic granuloma (PG), Peripheral ossifying fibroma (POF), Peripheral fibroma (PF), Peripheral giant cell granuloma (PGCG), fibrous hyperplasia (FH), Congenital gingival granular cell tumor (CGGCT), Poorly differentiated ossifying fibroma (PDSCC), Squamous papilloma (SP) and Peripheral ameloblastoma (PA).

SPSS 21 was used for data analysis while descriptive statistics was carried out for both continuous and categorical variables. Chi square and Fisher’s exact were carried out as appropriate for hypothesis testing and binary logistic regression was used to test the covariates and control for confounders. Significance was determined at p≤0.05.

4. Results
Mean age of the participants was 36.6±17.7 years while male to female ratio was 1:2.2. Skewness was 0.215 signifying a normally distributed sample. Prevalence of recurrence and tooth mobility was 26.8% (37) and 39.1% (54) respectively. Tooth mobility was highest among the 31-40-year-old while recurrence was commonest in the 21-40-year-old (fig 1). The maxilla, anterior sextant (fig 2) and the buccal/labial location were commonest sites of recurrence and tooth mobility (Table 1). Pyogenic granuloma has the highest prevalence of tooth mobility 50% (27) and recurrence 67.6% (25) while the least was Squamous papilloma (0%) and Congenital granular cell tumor (0%) for both (Figure 3).
Figure 2: Prevalence of Tooth Mobility and Recurrence by Sextants

Figure 3: Prevalence of the Lesions by Tooth Mobility and Recurrence

| Variable               | Mobile n(%) | Recurrence n(%) |
|------------------------|-------------|-----------------|
|                        | Total 54    | Total 37        |
| Educational level      |             |                 |
| Uneducated (formal)    | 5(9.3%)     | 3(8.1%)         |
| Primary                | 13(24.1%)   | 12(32.4%)       |
| Secondary              | 9(16.7%)    | 6(16.2%)        |
| Tertiary               | 28(51.9%)   | 16(43.2%)       |
| Sex                    |             |                 |
| Male                   | 19(35.2%)   | 14(37.8%)       |
| female                 | 35(64.8%)   | 23(62.2%)       |
| Jaw                    |             |                 |
| Maxilla                | 27(50%)     | 22(59.5%)       |
| Mandible               | 27(50%)     | 15(40.5%)       |
| Location               |             |                 |
| Buccal/labial          | 39(72.2%)   | 25(67.6%)       |
| Lingual/palatal        | 4(7.4%)     | 5(13.5%)        |
| Buccolabial/palatal    | 11(20.4%)   | 7(18.9%)        |
| Attachment             |             |                 |
| Pedunculated           | 30(55.6%)   | 20(54.1%)       |
| Sessile                | 24(44.4%)   | 17(45.9%)       |
| Malocclusion           |             |                 |
| Yes                    | 49(90.7%)   | 27(73%)         |
| No                     | 5(9.3%)     | 10(27%)         |
| Oral hygiene           |             |                 |
| Good                   | 5(9.3%)     | 4(10.8%)        |
| Fair                   | 9(16.7%)    | 6(16.2%)        |
| Poor                   | 40(74.1%)   | 27(73%)         |
| Underlying conditions  |             |                 |
| None                   | 48(88.9%)   | 35(94.6%)       |
| HIV                    | 3(5.6%)     | 0(0%)           |
| Medications            | 1(1.9%)     | 1(2.7%)         |
| Pregnancy              | 2(3.7%)     | 1(2.7%)         |

Table 1: Description of the Variables by Tooth Mobility and Recurrence

There is significant difference in the age groups (p<0.05), lesions, underlying conditions, malocclusion and oral hygiene (p=0.01) for tooth mobility while this applies to malocclusion and oral hygiene for recurrence of the lesions (p=0.01) on bivariate analysis (Table 2&2b). Logistic regression reveals significant relationship between age group 31-40 (p=0.01), PG, POF, PF (p<0.05), lingual/palatal location (p=0.05), recurrence (p=0.01), poor oral hygiene (p=0.01), tooth malpositioning (p=0.01) and medications (p<0.05). Recurrence has statistical significance relationship with secondary level of educational
(p<0.05), poor oral hygiene (p=0.01), and tooth mobility p<0.05. Omnibus test of coefficients and Hosmer-Lemeshow tests attests to the goodness of the fit of the model (Table 4).

| Variable         | Non mobile (84) | Mobile 54 | P Value | No Recurrence (101) | Recurrence 37 | P Value |
|------------------|-----------------|-----------|---------|---------------------|---------------|---------|
| Age groups (years) |                 |           |         |                     |               |         |
| <1               | 2               | 0         | 0.02*   | 2                   | 0             | 0.62    |
| 1-10             | 1               | 3         | 2       | 2                   |               |         |
| 11-20            | 11              | 6         | 15      | 2                   |               |         |
| 21-30            | 21              | 8         | 20      | 9                   |               |         |
| 31-40            | 16              | 22        | 29      | 9                   |               |         |
| 41-50            | 10              | 3         | 9       | 4                   |               |         |
| 51-60            | 9               | 4         | 8       | 5                   |               |         |
| 61-70            | 14              | 6         | 14      | 6                   |               |         |
| 71-80            | 0               | 2         | 2       | 0                   |               |         |
| Sex              |                 |           |         |                     |               |         |
| Male             | 24              | 19        | 0.26    | 29                  | 14            | 0.21    |
| Female           | 60              | 35        | 72      | 23                  |               |         |
| Educational level |                 |           |         |                     |               |         |
| Uneducated       | 9               | 5         | 0.34    | 11                  | 3             | 0.12    |
| Primary          | 13              | 13        | 14      | 12                  |               |         |
| Secondary        | 17              | 9         | 20      | 6                   |               |         |
| Tertiary         | 45              | 27        | 56      | 16                  |               |         |
| Lesions          |                 |           |         |                     |               |         |
| PG               | 61              | 27        | 0.01*   | 63                  | 25            | 0.84    |
| POF              | 16              | 8         | 19      | 5                   |               |         |
| PGGG             | 0               | 6         | 4       | 2                   |               |         |
| PF               | 2               | 7         | 6       | 3                   |               |         |
| FE               | 1               | 4         | 4       | 1                   |               |         |
| CGGCT            | 2               | 0         | 2       | 0                   |               |         |
| PDSSC            | 1               | 1         | 1       | 1                   |               |         |
| SP               | 1               | 0         | 1       | 0                   |               |         |
| PA               | 0               | 1         | 1       | 0                   |               |         |

Table 2: Bivariate Relationship between Tooth Mobility, Recurrence and the Independent Variables

| Variable         | Non mobile (84) | Mobile 54 | P Value | No Recurrence (101) | Recurrence 37 | P Value |
|------------------|-----------------|-----------|---------|---------------------|---------------|---------|
| Jaw              |                 |           |         |                     |               |         |
| Maxilla          | 45              | 27        | 0.84    | 50                  | 22            | 0.20    |
| Mandible         | 39              | 27        | 51      | 15                  |               |         |
| Sextant          |                 |           |         |                     |               |         |
| UAS              | 35              | 20        | 0.84    | 38                  | 17            | 0.97    |
| ULPs             | 8               | 5         | 10      | 3                   |               |         |
| URPS             | 3               | 4         | 5       | 2                   |               |         |
| LAS              | 24              | 15        | 30      | 9                   |               |         |
| LRPB             | 8               | 5         | 10      | 3                   |               |         |
| LRPS             | 6               | 5         | 8       | 3                   |               |         |
| Location         |                 |           |         |                     |               |         |
| Buccal/labial    | 53              | 39        | 0.12    | 67                  | 25            | 0.52    |
| Lingual/palatal  | 18              | 4         | 17      | 5                   |               |         |
| Buccolabial/palatal | 13                 | 11        | 17      | 7                   |               |         |
| Attachment       |                 |           |         |                     |               |         |
| Pedunculated     | 50              | 30        | 0.40    | 60                  | 20            | 0.35    |
| Sessile          | 34              | 24        | 41      | 17                  |               |         |
| Malocclusion     |                 |           |         |                     |               |         |
| Yes              | 16              | 49        | 0.01*   | 38                  | 27            | 0.01*   |
| No               | 68              | 5         | 63      | 10                  |               |         |
| Oral hygiene     |                 |           |         |                     |               |         |
| Good             | 30              | 5         | 0.01*   | 31                  | 4             | 0.01*   |
| Fair             | 39              | 9         | 42      | 6                   |               |         |
| Poor             | 15              | 40        | 28      | 27                  |               |         |
| None             | 78              | 48        | 0.02*   | 91                  | 35            | 0.13    |
| Underlying conditions |             |           |         |                     |               |         |
| HIV              | 0               | 3         | 3       | 0                   |               |         |
| Medications      | 4               | 1         | 4       | 1                   |               |         |
| Pregnancy        | 2               | 2         | 3       | 1                   |               |         |

Table 3: Bivariate Relationship between Tooth Mobility, Recurrence and the Independent Variables

*Significant
| Goodness of fit test            | Tooth mobility | Recurrence |
|---------------------------------|----------------|------------|
| Omnibus test of model coefficient| 0.001*         | 0.001*     |
| Hosmer-Lemeshow test            | 0.678          | 0.835      |

| Variable | Mobility | Recurrence |
|----------|----------|------------|
|          | Significance | df | Odd | Significance | df | Odd |
| Age groups |            |    |     |            |    |     |
| <1        | 0.25      | 1  | 1.353 | 0.39 | 1  | 0.756 |
| 01-Oct    | 0.15      | 1  | 2.102 | 0.3  | 1  | 1.088 |
| Nov-20    | 0.084     | 1  | 0.041 | 0.23 | 1  | 1.433 |
| 21-30     | 0.13      | 1  | 2.349 | 0.6  | 1  | 0.28  |
| 31-40     | 0.01*     | 1  | 6.959 | 0.57 | 1  | 0.315 |
| 41-50     | 0.19      | 1  | 1.71  | 0.76 | 1  | 0.095 |
| 51-60     | 0.48      | 1  | 0.509 | 0.34 | 1  | 0.928 |
| 61-70     | 0.32      | 1  | 0.972 | 0.76 | 1  | 0.096 |
| Sex       |           |    |     |            |    |     |
| Male      | 0.37      | 1  | 0.795 | 0.21 | 1  | 1.566 |
| Educational level |          |    |     |            |    |     |
| Primary   | 0.73      | 1  | 0.119 | 0.61 | 1  | 0.257 |
| Secondary | 0.25      | 1  | 1.33  | 0.02*| 1  | 5.836 |
| Tertiary  | 0.73      | 1  | 0.122 | 0.52 | 1  | 0.41  |
| Lesions   |           |    |     |            |    |     |
| PG        | 0.01*     | 1  | 27.897 | 0.67 | 1  | 0.192 |
| POF       | 0.01*     | 1  | 8.572 | 0.45 | 1  | 0.583 |
| PGCG      | 0.46      | 1  | 0.536 | 0.73 | 1  | 0.121 |
| PF        | 0.02*     | 1  | 9.403 | 0.67 | 1  | 0.186 |
| FE        | 0.17      | 1  | 5.72  | 0.72 | 1  | 0.134 |
| CGGCT     | 0.06      | 1  | 3.457 | 0.39 | 1  | 0.756 |
| PDSCC     | 0.25      | 1  | 1.353 | 0.46 | 1  | 0.536 |
| PA        | 0.77      | 1  | 0.085 | 0.46 | 1  | 0.536 |
| SP        | 0.08      | 1  | 3.043 | 0.54 | 1  | 0.375 |

Table 4: Multivariate Analysis to Determine Associated Factors of Tooth Mobility and Recurrence

*Significant

| Variable Categories | Mobility | Recurrence |
|---------------------|----------|------------|
|                     | Significance | df | Odd  | Significance | df | Odd  |
| Jaw                 |            |    |      |            |    |      |
| Maxilla             | 0.84       | 1  | 0.043 | 0.27 | 1  | 1.231 |
| Sextant             | 1          |    |      |            |    |      |
| UAS                 | 0.62       | 1  | 0.243 | 0.28 | 1  | 1.180 |
| ULPS                | 0.91       | 1  | 0.014 | 0.73 | 1  | 0.120 |
| URPS                | 0.18       | 1  | 1.790 | 0.89 | 1  | 0.020 |
| LAS                 | 0.82       | 1  | 0.053 | 0.50 | 1  | 0.452 |
| LLPS                | 0.91       | 1  | 0.014 | 0.73 | 1  | 0.120 |
| Location            |            |    |      |            |    |      |
| Buccal/labial       | 0.42       |    | 0.639 | 0.99 | 1  | 0.00  |
| Lingual/palatal     | 0.05*      | 1  | 3.824 | 0.52 | 1  | 0.406 |
| Nature              |            |    |      |            |    |      |
| Pedunculated        | 0.40       | 1  | 0.703 | 0.70 | 1  | 0.144 |
| Malocclusion        | 0.01*      | 1  | 69.847 | 0.01*| 1  | 13.947 |
| Oral hygiene        |            |    |      |            |    |      |
| Fair                | 0.01*      | 1  | 10.994 | 0.04*| 1  | 4.305 |
| Poor                | 0.01*      | 1  | 13.743 | 0.01*| 1  | 7.920 |
| Underlying conditions |         |    |      |            |    |      |
| HIV                 | 0.46       | 1  | 0.547 | 0.40 | 1  | 0.728 |
| Medications         | 0.03*      | 1  | 4.599 | 0.29 | 1  | 1.142 |
| Pregnancy           | 0.35       | 1  | 0.864 | 0.72 | 1  | 0.134 |
| Recurrence          | 0.01*      | 1  | 2.395 | 0.01*| 1  | 28.661 |
| Mobile              | 0.01*      | 1  | 28.661 | 0.01*| 1  | 28.661 |

Table 5: Multivariate Analysis to Determine Associated Factors of Tooth Mobility and Recurrence

*Significant
5. Discussion

Prevalence of recurrence was 26.8% and commonest in the middle-aged females (fig 1), this may be because majority of the subjects in this study are females and the hormonal changes common in the gender [4-6]. In agreement with previous studies [9,10], the maxilla, anterior sextants (fig 2) and the buccal/labial location were commonest sites (Table 1). Pyogenic granuloma has the highest prevalence of recurrence (67.6%) (Figure 3) and commoner with pedunculated lesions [11]. About three-quarters of subjects with recurrent lesions has a form of malocclusion, majority are also related to poor oral hygiene (Table 1). It is known that both factors are interrelated and that reactive gingival lesions are sequel of irritating factors like bacterial plaque and other factors [1-5]. There was significant difference in the malocclusion and oral hygiene for recurrence of the lesions on bivariate analysis (Table 2&2b). Recurrence has statistically significant relationship with secondary level of education which also supports the higher prevalence in the younger age groups. Malocclusion, poor oral hygiene, and tooth mobility were also significantly associated when confounders were controlled for, of all which may further the irritation of contiguous soft tissues and enhance regrowth.

The fact that none of the lesions were statistically associated with recurrence deviates from previous studies (7,8-11) which concluded there is high recurrence rate for PG.

Prevalence of tooth mobility was found in almost half of the participants in this study. This may be due to gingival overgrowths predisposing to plaque and calculus stagnation with a sequel of periodontitis and eventual bone loss and mobility [12]. Tooth mobility was highest among females 31-40-year-olds [4-6]. The maxilla, anterior sextants (fig 2) and the buccal/labial location of lesions were commonest sites for tooth mobility (Table 1) due to the preponderance of these lesions in these sites [9,10]. Pyogenic granuloma has the highest prevalence of tooth mobility (50%) while there was none found forcongenital granular cell tumor(Figure 3), thereason being associated edentulous ridge in the newborn [13]. Tooth mobility is commoner with pedunculated lesions, this may be because of higher propensity to accumulate plaque and hence, mobility of the lesion. 90.7% of tooth mobility is found related to tooth malpositioning with majority having poor oral hygiene [14-16]. Independent assessment of the covariates revealed significant relationship with age group 31-40, the age of highest prevalence of gingival enlargements. PG, POF, PF were also significantly associated, which arise from their higher prevalence and predisposition to periodontitis [17,18]. Recurrence is significantly associated with tooth mobility in a bidirectional fashion hence a further study to determine the cause-and-effect relationship will be necessary. Lingual/palatal location, poor oral hygiene, tooth malpositioning were also significantly associated [14]. Medications which in this case were anti-hypertensives, contraceptives and anticonvulsants (Table 4 & 3b) were also significantly associated factors. Gingival enlargement has been reported to be a common unwanted effect of these medications [19].

6. Conclusion

Poor oral hygiene and tooth malpositioning are factors significantly associated with both recurrence and tooth mobility associated with gingival enlargements in this study. This emphasizes maintenance of good oral hygiene and early orthodontic intervention to correct malposed teeth are critical in preventing these sequelae of gingival enlargement. Middle aged patients with history of gingival enlargements need specific instructions on the oral health care and prompt management of any tooth misalignment, quarterly oral health check is strongly recommended.

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