

Gender Distribution of Amalgam Restoration and Treatment Pattern in Regular Attendees of a Teaching Hospital in Nigeria

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ABSTRACT

Background: Amalgam restoration has been the main procedure carried out over the last two centuries in spite of going through 2 major wars by those opposed to amalgam; however, it has been known that several factors affect it from the stage of titration, packing and finishing of the material but studies on the effect of gender on the treatment and distribution pattern are very scarce.

Materials and methods: This is a 12 years cross-sectional longitudinal retrospective study of dental records of patients who had attended the Dental Centre of University College Hospital, Ibadan, a Teaching Hospital located in the South West of Nigeria, regularly for a minimum period of 5 years.

Results: A total of 2,094 restorations were found to meet the criteria with males accounting for 691 (33%) and females 1403 (67%). When distributed into classes of restoration, females had more class I, II and V restorations placed (69.8%, 62.7%, 63.6%) more than males (30.2%, 37.3%, 36.4%) respectively. Females also had more primary placements and replacement done for all the classes of restorations.

Conclusion: More female patients attended the conservative dentistry clinic regularly more than their male counterparts and more females had higher number of restorations placed, however, there is a reduced female:male ratio in the subgroup of class II amalgam restorations.

It was observed that the most frequent reason given in replacement of restorations was fractured amalgam restorations.

Keywords: Dental amalgam, Gender identity, Hospital, Teaching.

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INTRODUCTION

Amalgam restoration have been found to be affected by various factors which could occur during titration, packing

and finishing of the materials or it could be factors that affect the material as a result of operators deficiencies.

Many surveys have been conducted on various aspects of amalgam ranging from the physical properties of the material as it is manufactured (ADA specification no.1), correct preparation and use, retention, marginal fit, photoelastic studies of stress pattern, the stability of the material, delayed expansion, adaptation of the alloy to the cavity, marginal leakage of the air, effect of dye, water and bacteria on amalgam longevity, durability and failure patterns. However, there is a dearth of studies that have specifically determined if gender has any significant effect on distribution, treatment, failure patterns and factors affecting failure of amalgam restoration.¹⁻¹³

This study was carried out to determine if gender plays any role in or has any effect factor in the distribution and pattern of amalgam restorations in regular attendees in a Teaching Hospital Ibadan, Nigeria.

MATERIALS AND METHODS

This is a cross-sectional retrospective longitudinal study of regular attendees which spanned a period of 13 years from 1979 to 1992.

In developing economy as Nigeria, it is essential to determine who is a regular attendee. For the purpose of this study, a regular attendee is deemed to be a person who attended the clinic at least once in 24 months and with observation period of 5 years and patients were selected according to a present criteria which determined who was a regular attendee.

All records belonging to a patient were eliminated if the record of the treatment and the teeth treated were found to be inconsistent, ambiguous or/and inadequately documented.

The following criteria which had been used for various studies in the past were adopted and modified (Allan 1969, Robinson 1971, Lavelle 1976, Elderton 1983, Paterson 1984, Wall et al 1985 and 1988):

- When a tooth was extracted all the restoration on that tooth were regarded as having failed.
- When a restoration of the same denomination was inserted, the original one was considered as having failed.
- A mesio-occlusal (MO) or disto-occlusal (DO) was taken as a failure of mesio-occlusal or disto-occlusal restoration.

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- Placing an occlusal restoration on another position was not counted as a failure of mesio-occlusal, disto-occlusal or occluso-buccal restorations.
- An occluso-buccal or occluso-palatal filling was not taken as a failure of occlusal or buccal or palatal filling except when it was indicated in the records.
- A mesiodistal (MOD) or DO filling was not taken as a failure of occlusal filling except it was indicated in the records.
- When all or part of a restoration was removed and/or replaced. When there was caries either around or beneath a restoration.
- When parts or all of the surfaces of a restoration is removed to enable it provide retention for a new restoration on another surface.
- When endodontic treatment was carried out necessitating removal of all or part of a restoration and/or replacement of the restoration.
- When the tooth involved was crowned.
- When the condition of the restoration seriously interfered with the normal functional integrity of the tooth.
- When there was cervical amalgam overhang.
- If there was incomplete margin or marginal leakage.

The first stage was to determine which of the records met the present criteria and these patients were recalled using their contact addresses for actual examination to cross-check the records while the last stage was done to determine clinically which of the patients met the pre-set criteria above.

RESULTS

Table 1 shows the distribution of all the amalgam restoration by sex according to the various classes of amalgam. Table 2 demonstrates frequency table of criteria specified for placement and replacement of all restorations.

Six hundred and ninety-one restorations were placed in males (33%) while 1,403 amalgam restorations were placed in females (67%).

From the records, 433 patients were deemed to have met the pre-set criteria and the recall produced 277 patients, out of which recall and 180 were females (64%) and 97 were males (35.02%) present criteria with females accounting for 174 patients (66.16%) and males were 89 (33.84%).

For class I amalgam restoration, 380 amalgam restorations were placed in males while eight hundred and seventy eight restorations were placed on females which accounted for 30.21 and 69.29% respectively.

Out of 691 restorations placed in males, class I restorations amounted to 380 restorations, thus accounting for 54.99% of all amalgam restorations placed in males. Out of

1,403 restorations placed in females, class I accounted for 62.58%. The total number of class I restorations placed in males and females accounted for 18.15 and 41.93% of all restorations placed respectively.

For class II amalgam restoration, a total of 770 restorations were placed with 483 (62.73%) restorations placed on females while 287 amalgam restorations (37.27%) were placed in males. Class II amalgam restoration placed on males accounted for 41.53% of all restoration placed on males while those placed on females accounted for 34.43% of all restoration. Males accounted for 13.71% of all class II restorations while females had 23.07%.

When this is further analyzed according to sub-classes, it was found out that 310 MO restorations were placed with 104 restorations placed on males while 206 restorations were placed on females accounting for 33.55 and 66.45% respectively. When this is considered in relation to all the class II restorations placed. The MO placed on males and females accounted for 13.50 and 26.75% respectively and when this is considered in relation to the total number of amalgam restorations placed, it accounted for 5 and 10% of amalgam restorations placed in males and females respectively.

There were a total of 346 DO amalgam restorations with 142 placed on males (41.04%) and 204 placed on females (58.9%) accounting for 18.4 and 26.5% of all class II restorations placed respectively and 6.8 and 9.7% of all amalgam restorations placed respectively.

For MOD, there were 114 restorations out of which 41 were placed on males (35.90%), while 73 (64.04%) were placed on females, thus accounting for 5.3 and 9.6% of all classes of restorations recorded respectively.

For class II MOD, there were a total of 73 amalgam placed on females while 41 were placed on males (64.04 and 35.96% of class II MOD respectively). Class II MOD accounted for 5.94% of all restorations placed on males, 5.20% of all restorations placed on females.

DISCUSSION

There have been several studies on amalgam restorations in the past; however, none of these studies had shown the effect of gender on treatment. This study was carried out on a large scale by examining several factors such as placement, frequency of type of failures, cumulative failures, distribution of placement/replacements according to type of operators, classes of restoration, gender types and longevity of amalgam restoration thus, the element of bias toward a particular factor was eliminated.

Lack of continuity of longitudinal restorative records of dental treatment has always been a challenge and it presents



a major difficulty, however, this study is a cross-sectional, retrospective study of regular attendees over a period of 13 years. This study involves various operators with varying technical abilities; therefore the single operator bias is eliminated. It can be safely assumed that methods/techniques of operation were uniform and constant over the period of this study because the mode of teaching and instructions in the teaching hospital where this study was carried out has been relatively the same due to standardization of operative techniques.

Although this is a retrospective study, the recall of patients, screening for suitability of such patients by the author and the fact that the patients consented to this study would not likely have any untoward effects on the results obtained from this study. These patients had no prior knowledge of the purpose of recall except that they were informed of the need to do a free check-up without the attendant loss of time from jobs; more so, as the patients were given a staggered appointment both in date and time.

The record showed that out of the 277 patients that were possible to be recalled, 180 were females while males were 97. Even recall and examination after examination of some of the patients that did not meet the criteria showed that 263 patients were clinically acceptable out of which females accounted for 174 patients (66.16%), while males were 89 (33.84%).

The result obtained showed that more females were treated than the males (174 and 89 respectively) which is almost a ratio of 2:1. It could also point to the fact that female patients tend to stick to a treatment center than males thus keeping regular appointments.

Examination of records of patients prior to recall showed that, out of 433 patients that were found suitable for this study, 150 were males (34.6%) while 283 females (65.4%) which means more females were treated (1:2). After recall, 277 patients responded out of which females were 180 (65%) while males accounted for 35%. This signified that females

are more responsive to appointments and recalls in this study than males and are also more likely to stick to a clinic for their treatment more than their male counterparts. This figure changed slightly when the numbers of restorations placed and replaced were put into consideration. Females had 67% of restorations placed while males had 33% indicating that females had more restoration where as in a study carried out by Tyas,¹⁴ the number of restorations received by females was 54% while that for males was 46%. The female:male differential ratio in Tyas study was around 5:6 whilst that of this study was 2:1.

The approximate average number of restoration per male and female were 7.8 and 7.1 respectively which showed that males were as susceptible to dental caries as their female counterparts. It also shows that the male population were as exposed to causative factors of caries as the female population. Just as the female population is likely to be more exposed to chocolates, chewing gums, etc. the male population may be as equally exposed to sugars in tea and coffees especially in battling the stress of work in the office. It means that females tend to take time to attend to their oral health and pay more attention to regularity in the clinic attendance.

Class I restorations showed that the ratio of restoration placed on females to that of males was 7:3. For class II, it was 5:3, while class V was 2:1. However, for each of the sub classes of class II, the ratio of restorations placed in females to males were 2:1 for class II MO, 7:5 for class II DO, while MOD was 7:4. This effectively meant that more MO were placed in females than males while the ratio of DO and MOD placed in female to male were reducing according to the report of this study. No MOD cavity was placed as primary placement thus the reduction in female: male ratio of MOD restoration indicated that less replacements of MOD is being carried out in males.

Primary caries was the most reason cited for placement of amalgam restorations in the study while replacement was due to fractured amalgam restoration (Table 3).

Table 1: Summary table for the distribution of all classes of amalgam restoration by sex

| Sex | Description | Class I | Class II | | | Class V | Row total |
|--------|--------------|---------|----------|-------|-------|---------|-----------|
| | | | IIMO | IIDO | IIMOD | | |
| Male | Number | 380 | 104 | 142 | 41 | 24 | 691 |
| | Row (%) | 55 | 15.05 | 20.55 | 5.93 | 3.50 | — |
| | Column (%) | 30.21 | 33.55 | 41 | 35.96 | 36.36 | — |
| | Total (%) | 18.15 | 4.97 | 6.78 | 1.96 | 1.15 | 33 |
| Female | Number | 878 | 206 | 204 | 73 | 42 | 1403 |
| | Row (%) | 62.58 | 14.68 | 14.54 | 5.2 | 3 | — |
| | Column (%) | 69.79 | 66.45 | 59 | 64.04 | 63.64 | — |
| | Total (%) | 41.93 | 9.84 | 9.74 | 3.49 | 2.01 | 67 |
| | Column total | 1258 | 310 | 346 | 114 | 66 | 2094 |
| | Total (%) | 60.08 | 14.8 | 16.52 | 5.44 | 3.15 | 100 |

Table 2: Frequency table of criteria specified for placement and replacement of all restorations

| | <i>F</i> | <i>M</i> | <i>Total (%)</i> |
|-----------------------|----------|----------|------------------|
| Primary caries | 1063 | 523 | 74.2 |
| Fractured restoration | 235 | 101 | 16 |
| Ditching | 57 | 22 | 3.8 |
| Recurrent caries | 42 | 18 | 2.9 |
| Dislodged restoration | 15 | 11 | 1.2 |
| Cervical abrasion | 15 | 12 | 1.3 |
| Others* | 9 | 4 | 0.6 |
| | 1403 | 691 | 100 |

*Includes cervical overhang, attrition

It is the general belief in developing economies like Nigeria where this study was carried out that the major factor that makes patient to visit or keep their appointments is pain.¹⁵ According to same study, 98% of the female patients recalled relish in breaking meat-containing bones unlike the 14% recorded in their male counterparts.¹⁵ This is in agreement with another study which stated that restorations in patients with excessive occlusal function survived significantly less time than those with 'normal' occlusal function.¹⁶ The response rate of 64% in this study is very high compared to some other studies¹⁴⁻¹⁷ which serves as an indicator for reliability of the results obtained.

CONCLUSION

Although more female patients attended the hospital and more regularly, the number of teeth treated or restorations placed per female is identical to that of the males. However, due to the reduced female:male ratio of restoration placed in the class II subsector group and the most frequent reason cited for loss of restoration in this environment was fractured restorations, it therefore means that both more of the female gender indulge in what could easily fracture off the class II restoration at the isthmus.

There is the need to educate each patient on the need to avoid chewing hard substances as this will definitely have a deleterious effect on the restorations. More so, the compressive strength of amalgam even though is close to that of enamel but not adequate to withstand occlusal forces that may bear on the teeth and restoration.

Table 3: Frequency table of criteria specified for replacement of all restorations

| | <i>F</i> | <i>M</i> | <i>Total (%)</i> |
|------------------------------|----------|----------|------------------|
| Fractured restoration | 235 | 101 | 65.9 |
| Ditching | 57 | 22 | 15.6 |
| Recurrent caries | 42 | 18 | 11.8 |
| Dislodged | 15 | 11 | 5.1 |
| Other (cervical overhanging) | 7 | 1 | 1.6 |
| | 356 | 153 | 100 |

REFERENCES

1. Barber T, Reisbeak MH. Amalgam, past, present and the future. *J Am Dent Assoc* 1973;86:863-869.
2. Elderton RJ, Jenkinsoc BG, Marshall KJ, Hooper SM, Forster LV, Hooper GR, Roberts K. Changing perceptions of the requirements of cavity preparation. *Br Dent J* 1990;168(1):30-31.
3. Markley MR. Silver amalgam. *Oper Dent* 1984;9(1):10-25.
4. Alingust TC, Cowan RD, Lambert RL. Conservative amalgam restorations. *J Prosth Dent* 1973;29:524-528.
5. Brown D. Dental amalgam. *Br Dent J* 1988;164:253-256.
6. Greener EH. Amalgam yesterday, today and tomorrow. *Oper Dent* 1979;4:24-35.
7. American Dental Association Specification No.1 revised. Council of Dental Materials and Devices. *J Am Dent Assoc* 1969;79:1206-1209.
8. Black GV. The physical properties of the silver-tin amalgam. *Dent Cosmos* 1896;38:965-992.
9. Jorgensen KD. The mechanism of marginal fracture of amalgam fillings. *Acta Odontol Scand* 1965;23:347-389.
10. Elderton RJ. Assessment of the quality of restorations. *J Oral Rehabil* 1977;4:217-226.
11. Mahler DB, Terkla LG, Van Eysden J. Marginal fracture of amalgam restorations. *J Dent Res* 1973;52:823-827.
12. Mjor IA, Espevik S. Assessment of variables in clinical studies of amalgam restorations. *J Dent Res* 1980;59:1511-1515.
13. Mjor IA, Jokstad A, Qvist V. Longevity of posterior restorations. *Int Dent J* 1990;40:11-17.
14. Olaleye AO. Longevity and failure pattern of amalgam restorations of the University College Hospital, Ibadan Nigeria (Dissertation). Ibadan, Nigeria: FWACS:1997.
15. Tyaas MJ. Placement and replacement of restorations by selected practitioners. *Aust Dent J* 2005;50(2):81-89.
16. Rousner LH, Green TG, Charbeneau GT. Placement and replacement of amalgam restorations: a challenge for the profession. *Oper Dent* 1987;12:105-112.
17. Fried KH, Hiller KA, Schmaltz G. Placement and replacement of amalgam restorations in Germany. *Oper Dent* 1994;19:228-232.

