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Orginal Research Article

Re-intervention in restorative dentistry: Knowledge and attitudes of senegalese dentists

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ABSTRACT

Background: Replacing or repairing a defective restoration has become a daily practice in dentistry. It is therefore necessary to know how to evaluate a restoration to decide whether or not to re-intervene and then to choose whether to replace, repair, or refrain from doing so by setting up a monitoring system. The best-known evaluation criteria accepted by the scientific community are the modified Ryge / USPHS criteria and the FDI criteria.

Results: In Senegal, no such study has been carried out, and it was with this in mind that our study was carried out, involving 158 dental surgeons. The results showed a predominance of men (70.89%). The average age was relatively young at 37. The study confirmed that re-intervention is common practice among the dentists surveyed: the majority (77.72%) had done a re-intervention less than a week before the survey. The most common reason encountered by dentists for their last re-intervention was fracture of the tooth or restorative material with a rate of 36.71%, then we have caries recurrence and advanced decay and wear with the same rate of 17.09%, followed by pain or hypersensitivity with a rate of 16.46%.

After diagnosis, 73% replaced the restoration deemed defective, versus 22% who chose to repair the restoration. Clinical evaluation criteria were used by only 12.66% of the sample. The majority, 74.05% of practitioners, take into account the benefit/risk/cost ratio.

Conclusion: The results of this study show the limits of dental surgeons' knowledge in re-intervention, as well as the lack of codification of parameters related to this practice. It is therefore necessary to develop training programs and teaching units for both initial and continuing training.

1. Introduction

Replacing restorations has always played a major role in our daily practice. Nevertheless, it still has its drawbacks, ranging from time-consuming treatment to the loss of tooth structure that can impact pulp integrity. From another angle, restoration replacement remains an alternative in our therapeutic choices, and its criteria are not fully codified, thus remaining a controversial subject in dental schools.[1] The question today is whether a restoration whose longevity is threatened by its defective condition should be replaced in whole or in part. Is repairing a restoration more suited to tissue preservation, less costly, and more acceptable? The other approach is to refurbish the restoration instead of repairing it, even if repairing implies partial replacement. Replacement is achieved by reworking the entire restoration with the same or a different material, with or without modifying the contour of the cavity shape. Such improvements can make the restoration clinically satisfactory and prolong its functional life in the mouth.[2]

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A review of the literature shows that several studies have been carried out to determine the reasons for re-intervention worldwide.[3–5]

None of these studies have been carried out in Africa, and more specifically in Senegal.

This study aimed to assess dental surgeons' theoretical and practical knowledge of re-intervention.

2. Materials and Methods

This preliminary study was descriptive and took place over four months.

The study population consisted of practitioners randomly selected from a list compiled based on information provided by the National Order of Dental Surgeons of Senegal, the Bucco-dental Division, and the Army health direction. All practitioners with an exclusive and specialized practice were removed from the list.

The sampling method was inspired by that used in the study of Niang B.[6] It involved stratified sampling. The target population consisting of general practitioners, was divided into two groups according to their mode of practice and their membership in the order's registers.

Private practitioners, including dentists, practice exclusively in private.

Public practitioners, comprising dentists working in public health facilities. These 2 groups correspond to the 2 strata, and the similarity between the statistical units of these strata is represented by the fact that the practitioners who make them up have received the same initial university training. Thus, for the stratum represented by private dentists (stratum 1), the sampling frame was equal to 101, and for the stratum represented by public dentists (stratum 2), the sampling frame was equal to 86. This gives a total of 187 dentists.

The sample size was calculated using SCHWARTZ's formula: n (£α) 2¬pq/I2, which can be used in cross-sectional studies where £= reduced deviation= 1.96; α= risk of error=0.05; p= proportion of dentists with no knowledge of re-intervention in conservative dentistry. Failing to find a study on knowledge, we estimated prevalence at 10%; q= complement= 90%; I= precision = 5%. These parameters gave us a sample size of 138. To compensate for lost or damaged cards and to gain power, we increased the size to 158.

Batches of questionnaires, accompanied by an explanatory letter, were sent to dentists via the post for those in regions and areas with poor access; on the other hand, those in the city center received their envelopes directly.

A stamped envelope was enclosed with each letter so that completed questionnaires could be returned at the end of the survey. The questionnaire had to be filled in carefully. It included information on the practitioner (age, sex, type of practice, seniority), the reason for consultation (pain, rift, aesthetics, fracture, other reasons to be specified), the tooth or teeth treated, and the reason for re-intervention.

Confidentiality was assured, as no specific information was required to identify the practitioner or patient.

In terms of results, quantitative variables were expressed by their means and standard deviations. Qualitative variables were described by their number and percentage.

The association between categorical variables was tested using an X2 test.

All data were collected and statistically analyzed using SPSS software (Statistical Package for Social Sciences version 11.5 Chicago Illinois).

3. Results

A total of 158 out of 187 dentists responded, i.e. a rate of 84.49%. The sample was predominantly male, i.e. almost 2/3 of the study population (112 men vs. 46 women). $p \leq 0.05$.

Out of the total number of dentists in our sample, the majority (56.33%) had less than 5 years of experience. The next group consisted of 42 dentists who had between 5 and 10 years of experience. 20 dentists had between 10 and 20 years of experience, and only 7 dentists (4% of the sample) had more than 20 years of experience.

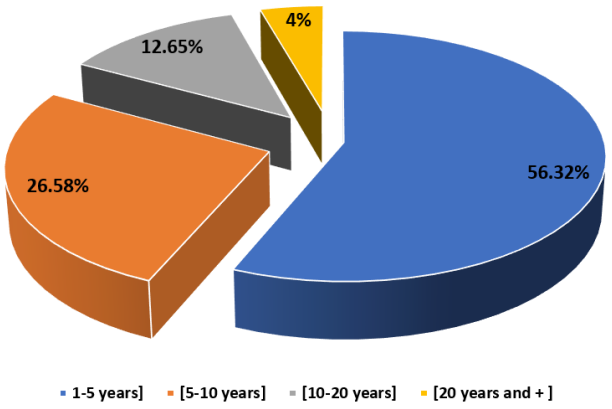

Figure 1: Experience

The private sector was more represented with around 2/3 of respondents (62%), followed by the public sector with 30.38%, and then the para-public sector which was poorly represented with 6.69% of the sample. $p \leq 0.05$

In terms of reinterventions, more than $\frac{3}{4}$ (122) of dentists stated that their last reinterventions were less than a week old at the time of the survey, and only 36 practitioners stated that their last reintervention was more than a week old.

The most common reason encountered by dentists for their last re-intervention was fracture of the tooth or restorative material with a rate of 36.71%. We have caries recurrence and advanced decay and wear with the same rate of 17.09%, followed by pain or hypersensitivity with a rate

of 16.46%.

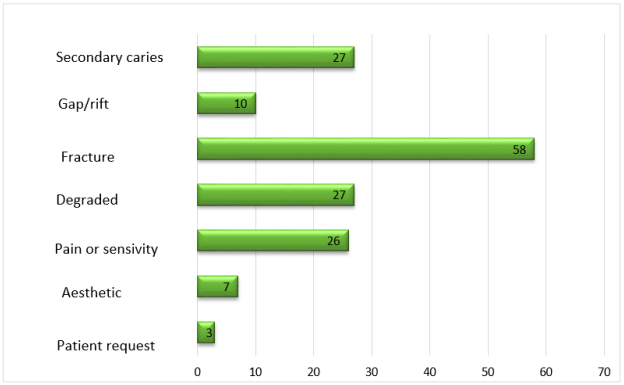

Figure 2: Reason for re-intervention

Nearly 50% (82) of the dentists in the sample were responsible for the initial restoration.

In terms of clinical criteria for evaluating restorations, only 20 of the 158 dentists used these criteria, while the remainder did not. Of the 20 dentists who used evaluation criteria, 10 relied on FDI criteria, and the other 10 on USPHS criteria.

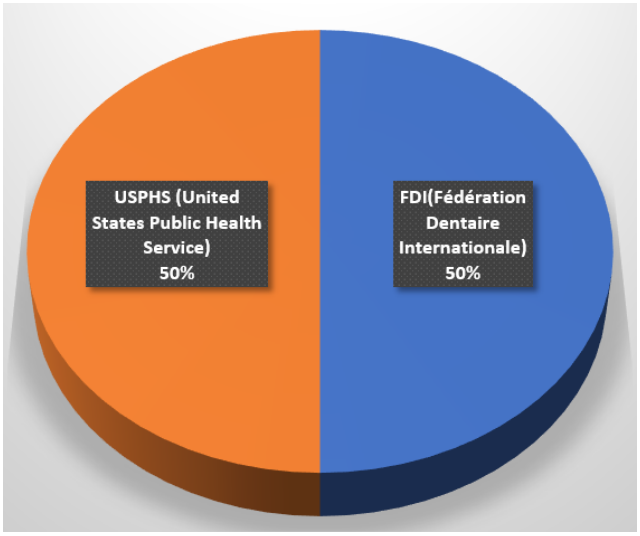

Figure 3: Used criteria

Regarding the decision to repair or completely replace the restoration, nearly $\frac{3}{4}$ (73.43%) of the respondents had replaced the restoration during the re-intervention, while 21.52% had repaired the restoration. Only 8 dentists had opted for a joint prosthesis during the re-intervention.

In terms of materials used during reintervention, composites and glass ionomer cement (GIC) were the most commonly used restorative materials, with 41.14% and 38.61% respectively. The use of amalgams represented only 15% of the sample, and conjoint prostheses were used in only 5% of cases.

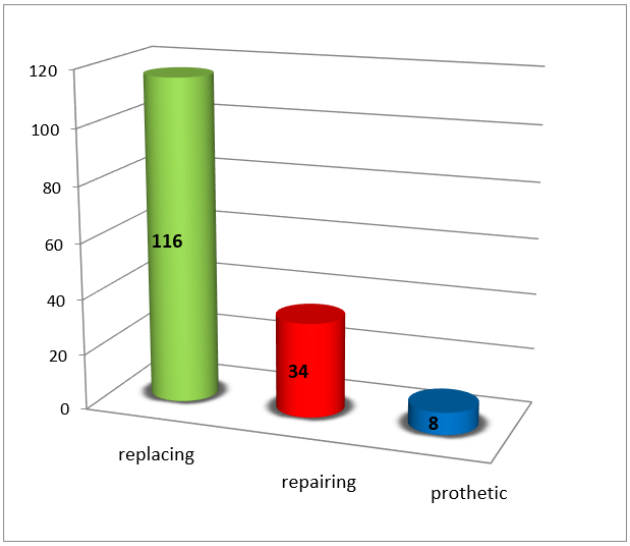

Figure 4: Reintervention options

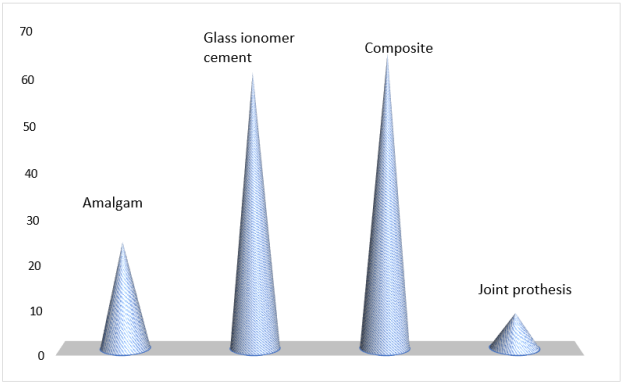

Figure 5: Material options

Benefit/risk and cost parameters were taken into account by 74.05% or 117 dentists, while the remainder did not.

4. Discussion

The survey revealed a relatively young population (over 90% aged between 30 and 40). This is in line with previous studies carried out in Dakar.[6] Our results showed that the private sector predominates (62.66%) over the public sector (30.38%), despite the efforts made by the government to recruit healthcare personnel. This is due to a demographic boom and the entrepreneurial spirit of young, newly qualified surgeons. For a decade now, dentists have been going into private practice as soon as they have defended their doctoral thesis. At the same time, in the civil service, recruitment is based on seniority. As a result, new doctors are not waiting to enter private practice.

Almost 75% are male, showing the predominance of men in the dental profession. This finding is not specific to Senegal alone: in a study by Philipp Kanzow and Robin Hoffmann[5] in Germany, 59.1% of dental surgeons were men.

Re-intervention is a frequent practice in restorative dentistry. Re-intervention to completely replace or repair a restoration has become part of our general practice. Re-intervention is often costly and sometimes requires the sacrifice of healthy dental tissue, compromising dental pulp vitality and likely to accelerate the restoration cycle or premature tooth loss. Over $\frac{3}{4}$ of respondents had a re-intervention less than a week before the survey date.

In recent years, several studies have been carried out in several countries on the reasons for re-intervention in restorative dentistry.[7,8] Despite their acknowledged limitations, these studies are of great value in our understanding and knowledge of the characteristics of permanent restorations and restorative materials.[9,10]

Every restoration has a lifespan, so it's a question of evaluating and deciding whether to repair or replace it entirely. It's also a question of choosing the right material for re-intervention. In recent years, restoration materials and techniques have been extensively published in scientific journals.[11]

Vassiliki Deligeorgi's study, which is a review of the literature based on a dozen studies, is in line with this approach and makes a major contribution to our understanding of the characteristics of reintervention.

The most frequent reason for re-intervention is fracture (either of the tooth or the material used) with a rate of 36.71%, followed by caries revision (17.09%), which is in line with the results of the Youssef and Khoja study.[12]

This contrasts with a study carried out in the USA by the DPBRN, where the main cause of re-intervention was secondary caries (43%).[13]

This difference can be explained by the use of GIC as a definitive restorative material by many practitioners here in Dakar. In this study, 34.81% or 55 cases, GIC was used at the time of the first procedure.

Nearly $\frac{3}{4}$ of those surveyed replaced the defective restoration. These results are in line with a study carried out in the USA by the DPBRN, where 75% of practitioners opted for replacement.[13]

But also in 40% of cases of re-intervention, the initial material was amalgam, and the main reason for re-intervention was fracture (36.71%) of either the tooth or the material. These two parameters justify the respondents' choice of replacement rather than repair. This confirms a study carried out in the USA by the DPBRN, where practitioners chose replacement if the initial material was amalgam.[14]

In our study, almost 22% opted to repair the restoration. We also note the same trends in Valeria's study,[13] wherein 25% of cases of defective restorations, practitioners repaired them. In Tim J. Heaven's study,[15] the majority (72%) of dentists opted to repair the restoration, where the initial material used was composite, in contrast to our study, where the material most commonly used for the initial restoration was amalgam. After reintervention, the material most commonly used by practitioners was GIC.

Only 12% of dentists surveyed use evaluation criteria, which is relatively low. This could be explained by the absence of a teaching unit on re-intervention in restorative dentistry in initial training. Re-intervention is not taught in training.

The combined ratio of risk, benefit, and cost was largely taken into account at the time of re-intervention, i.e. 74.05% of cases in our sample.

The cost of a material is not limited to the product's selling price but also includes the cost of restoration. This latter parameter takes into account the time spent in the chair, the cost of the average instrumentation required to apply the product, its shelf life, the volume of the material, which is often decisive, and its expiry date.

In public health terms, the cost of using a biomaterial must be balanced against the benefits obtained by the patient: durability, esthetics, functional quality of the restoration, and the possibility of repair.

Tissue cost must be taken into account to minimize the risk of fractures, thus reducing the prognosis for re-intervention.

5. Conclusion

Every restoration placement requires a maintenance program. As life expectancy increases, the conservation of teeth on the arch must be increased. The inexorable degradation of the materials used and their interfaces with dental tissues calls for re-interventions. This study shows a real gap in both the level of knowledge and the codification of parameters linked to re-intervention. These gaps in this field must be filled by dedicated teaching in restorative dentistry training.

6. Source of Funding

None.

7. Conflict of Interest

None.

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