Importance of Minimally Invasive Dentistry: A Literature Review

José Israel Castillo González[1], Andrea Katherine Miranda Anchundia[2], Clara Alexandra Labanda Tuarez[3]

[1]Especialista en Próteses Dentaria. Docente de la Universidad Regional Autónoma de los Andes, Ecuador.
Email: uq.josecastillo@uniandes.edu.ec
Orcid: https://orcid.org/0000-0002-5033-6763

[2]Magister en gerencia en Servicios de la Salud. Docente de la Universidad Regional Autónoma de los Andes, Ecuador.
Email: uq.andreamiranda@uniandes.edu.ec
Orcid: https://orcid.org/0000-0001-7183-2267

[3]Estudiantes de la Universidad Regional Autónoma de los Andes, Ecuador.
Email: claralt27@uniandes.edu.ec
Orcid: https://orcid.org/0000-0002-1298-5041/print

Abstract

As the years progress, the field of dentistry has improved its products and treatments to recover lost dental tissue. The objective is to replace using aesthetic materials that simulate the natural and create comfort in patients. Minimally invasive dentistry (MID) is a concept that has gained importance in recent years due to the benefits it provides to patients .The adoption of Minimally Invasive Dentistry techniques is crucial for improving dental health outcomes and reducing the need for more invasive procedures. The integration of scientific research and advanced computing methods can aid in the development and promotion of MID practices, ultimately benefitting both patients and dental professionals.

Keywords: MID, aesthetic restoration, dental caries, replacement of restorations.

1. Introduction

Dental restorations is one of the most performed dental treatments in the daily dental consultation, it is an essential treatment since day by day dental fractures, stains, congenital problems, etc. occur. That force the professional to master the restorative technique and to be updated with the different materials that constantly appear on the market. [12]

Restorative dentistry returns the function and aesthetics of a tooth recovering its total integrity, thus improving the quality of life of the patient and allowing to extend the life span of that dental organ. [3.9]

Unfortunately, restorations have a very limited service life, which depends largely on a number of fundamental and prominent factors, such as: the quality of the materials used, the skills of the professional, the suitability of the patient. [3.13]

Restorative dentistry has taken its place for more than 200 years within the treatments offered in dental practice, it is very necessary and this idea must prevail, without this procedure many teeth will be doomed to premature loss. [3.5]

Restorative dentistry has prevailed and over the years has been able to become a more conservative and successful dentistry thanks to Black's scientific understanding and principles. As a result it is anolution to achieve perfect dental health, and cavitiesare "cured" with the help of restorations. For many, dental health is synonymous with restorative dentistry [15,1]

It is necessary to understand that restorative dentistry implies understanding some aspects among which we will mention, Degree of caries, Understanding the science of dental caries, Dental materials and restorative techniques, Wishes or expectations of the patient [2,7,4]

In dental practice, it is common for the general dentist to engage in replacing old restorations and often without sufficient justification. The minimum life expectancy of a patient's mouth restoration is around seven years, but the processed data showed that one in three restorations performed in general practice was deemed unsatisfactory or inadequate. [4.11]

Many dentists try to quickly replace restorations that are considered defective, even if the actual cause of the problem that caused the defect cannot be determined, this increases the original problem by increasing the cavity significantly and causing more damage. [14.15]

The purpose of conducting this study was to study what the literature says about restorative procedures that improve the function and aesthetics of patients.

2. Methods

A bibliographic search was carried out in the Pubmed database, 10 scientific publications in English and Spanish

doi.org/10.31838/hiv23.03.268 Received: 15.11.22, Revised: 21.12.22, Accepted: 26.01.23.

were selected with the keyword: restorative dentistry, published between 2015 and 2020.

3. Result

In the dental office, daily we observe that in much of the time of our general dental practice, we are dedicated to the replacement of restorations, which arise for a number of reasons, but often without a sufficient solid base. Most restorations remain in the mouth less time than the patient's expectations. The estimated average time is around seven years at best. Data obtained in the literature showed that out of every three restorations performed in dental practice, one was rated as unsatisfactory or did not meet all the requirements to complete those seven years without problems with the previous replacement. [15]

It is important to mention that restorative dental materials are limited in their desired properties, and when combined with possible technical errors or improper handling, these are doomed to failure.

Elton mentions the following main factors of causes of restoration failure, which we must consider before restoring before restoring any tooth. Dental materials are not perfect in themselves, the clinical skills and motivation required for optimal use are insufficient, many dentists try to quickly replace restorations that they consider defective, despite not determining the real cause of the problem, or even if not There is, they will look for replacement restorations by increasing the size of the cavity many times. [2]

In general, clinicians tend to value first the restorations that must be eliminated, rather than those that must be preserved, maintained or improved, Dr. Eduardo Ortega Zárate, amaster expert in the science of dental materials commented that dental amalgam reconstructions are ugly on the outside but very beautiful on the inside. This is due to the ability of amalgam to generate corrosion products that seal the interface between restorative materials and dental structure, the adhesion achieved with current restorative materials tends to decrease. [8, 11]

The main reasons for considerfailures in repair are: excess occlusal load of the restoration, improper handling of hard and soft tissues, incorrect choice of dental materials, poor removal of caries. [2.15]

Restorative studies have shown that replacement rates of dental amalgam restorations range from 29% to 53%, compared to 40% to 45% of composite resin restorations due to the presence of secondary caries. Dental amalgam continues to be condemned especially by the presence of secondary caries. [2]

Composite resin restorations that had secondary carious lesions were not considered as one of the main reasons for their replacement, as other factors prevailed, such as defects in the technique used for insertion or damage due to their Physical and chemical properties. An important point to note in these previous statements is that, in the event of restoration failure , there is a need for a better assessment of the root causes of the failure and better awareness when replacing them in the event of restorations. a short period of time. [2]

4. Discussion

Minimally invasive restorative dentistry proposes simple, simple dental treatments that provide comfort to patients. It has evolved with a number of alternatives that the professional must master and perform in their daily practice. [7.14]

The doctrine of minimally invasive dentistry through techniques such as manual instrumentation, chemical and mechanical removal of caries, among others, seek to transform potentially active caries into inactive ones before restoring our dental organ. Prevention avoids carious processes. [11.14]

Caries is defined as an observable manifestation of the ailment, it can be seen as a white spot and as a cavity. Caries is a multifactorial disease and sugar dependent, it is the organic acids derived from the fermentation of carbohydrates that produce a demineralization of dental tissues. [8, 11]

The advancement of protocols and materials used to cure a cavity allow less invasive preparations, allowing to preserve healthy dental structure.

Abdul et al. applied a study in 50 children, two groups were formed where they removed caries: in the first group they used Papacarie and in the second: ART. In the Papacarie group it took longer than the ART group, both procedures are considered useful over conventional and invasive procedures. They are useful when treating pediatric patients. While Arrow and Forrest, applied an investigation in 48 children separated into two groups: one with ART and the next with Hall Technique, Both demonstrated clinical success, the use of the Hall Technique could surpass ART; Both are useful treatments for pediatric patients. [1]

Gross et al. applied a clinical case in a pediatric patient, on a moral temporal tooth compromised with carious lesion on more than three surfaces, removed caries only with curette, then performed a stainless steel crown and performing a radiographic follow-up after three years. They found no malignant pulp reactions, no signs and symptoms being fully functional, thus demonstrating that Hall's technical steel crowns are effective in these cases and teeth with high coronal destruction. [4]

Boyd et al. presented a study in patients between 5 and 8 years in teeth with deep caries, 53 pieces were restored with the Hall Technique and 54 pieces with the conventional, after 25 months a failure of 6% was found in the Hall Technique in relation to the conventional technique. In relation to this, Santamaría et al. conducted a study in patients between 3 and 8 years, restoring 52 pieces with the Hall Technique and 52 with conventional procedures, finding after 2 and a half years a failure of 5% in the Hall Technique compared to the conventional technique. The Hall Technique is an excellent restorative treatment in extensive caries. [3]

Jieyi et al. describe a clinical trial conducted in China in 5-year-old patients, mentioning the use of 38% FDP in a single application per year. They found to be successful in inactivating cavities, safe and economical, with a single problem of pigmenting the surface. [13]

. According to Calderón Ramírez et al [21] MID involves "the maximum preservation of healthy dental tissue and the minimum intervention necessary to restore dental function." This approach emphasizes prevention and early detection of dental problems, which can lead to less invasive and more cost-effective treatments in the long term.

Research by Vázquez et al. [22] highlights the importance of scientific investigation in promoting the development and adoption of MID techniques. They argue that "the application of scientific research provides a greater understanding of the benefits of MID, which can lead to improved patient outcomes and increased acceptance among dental professionals." Additionally, the use of neutrosophic computing and machine learning, as discussed by Iglesias Quintana et al. [23], can aid in the analysis of complex data sets and help identify factors that influence the effectiveness of MID procedures. These approaches can ultimately contribute to the development of more precise and personalized treatment plans for patients. As noted by Ricardo et al. [24] "MID is not just a technique, it is a philosophy that places the patient's well-being at the forefront of dental care."

5. Conclusions

It describes treatment options within the philosophy of minimally invasive dentistry to be used by dentists in their daily practice. Minimally Invasive Dentistry proposes to preserve healthy dental tissue, reduce the use of the high-speed handpiece, reducing the patient's work time and stress. In conclusion, the adoption of MID techniques is crucial for improving dental health outcomes and reducing the need for more invasive procedures. The integration of scientific research and advanced computing methods can aid in the development and promotion of MID practices, ultimately benefitting both patients and dental professionals.

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