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Evaluating Transit Fixatives in Dental Clinics: A Comparative Insight

Nandini Bhardwaj[1*], Ibrahim[2], Amberpreet Kaur Khangura[3], Nitish Bhat[4], Ishrat Jahan[5], Dinesh Yasothkumar[6]

[1]Assistant Professor , Department of Oral &Maxillofacial Pathology & Oral microbiology, Maharishi Mahakandeshwer college of Dental Sciences and Research, Maharishi Mahakandeshwer Deemed to be University, Ambala, Haryana, Pin Code: 133203

[2]Reader, Department of Oral & Maxillofacial Pathology, Himachal Institute of Dental Sciences, Paonta Sahib, Sirmour, Himachal Pradesh ,Pin Code:173025

[3]Assistant Professor, Department of Oral and Maxillofacial Pathology and Oral Microbiology, Dr. Harvansh Singh Judge Institute of Dental Sciences and hospital sector 25 Punjab University Chandigarh, Pin Code: 160014

[4]Lecturer, Department of Oral & Maxillofacial Pathology, Government Dental College, Srinagar

[5]BDS (Bachelor of Dental Surgery)

[6]Assistant Professor, Department of Oral Pathology, Saveetha Dental College and hospitals, Saveetha Institute of medical and technical sciences, Chennai

***Corresponding Author:**

Dr. Nandini Bhardwaj

Postal Address: Maharishi Mahakandeshwer College of Dental sciences and research, Mullana, Ambala, Pin Code: 133203

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ABSTRACT

Introduction: Introduction: Oral tissue biopsy maybe necessary for lesions that cannot be diagnosed on the basis of the history and clinical findings alone. A thorough inspection of the oral cavity should be a part of any complete head and neck examination. Biopsy is often the definitive procedure that provides tissue for microscopic analysis when additional information is required to guide any indicated therapy. Biopsied tissue is placed in a fixative. In certain situations fixative might not be available.

Materials and Methods: The study included commonly available solutions in a dental clinic/ clinic and fresh tissue (goat tongue).

Conclusion: Transit fixatives are very useful in certain situations where formalin is not readily available.

Keywords: Fixatives, Transit, Formalin

1. INTRODUCTION

In dental clinics, rural areas where screening programmes, medical camps and public health service centres were conducted, doctors generally see number of patients. Patients with suspicious lesions are advised for immediate biopsy. In certain situations formalin might not be readily available. In such cases, the biopsied tissues will be discarded or get damaged if left out for drying which poses difficulty in diagnosis by pathologist. It is heartening to know that some of the commonly available, solutions give pleasant surprises. It's a breakthrough in the field of tissue preservation. Here, we are introducing the new TRANSIT FIXATIVES. Fixation is a process in which a tissue specimen is placed in a fluid (fixative) that preserves the cells as nearly as is possible in their natural state.

AIMS AND OBJECTIVES:

To explore more economical, eco-friendly and easily available solutions that can be used as a transit media/ transporting media for tissue specimens.

2. MATERIALS AND METHODS

This study included commonly available solutions in a clinic/ dental clinic like Spirit, Saline, Betadine solution, Hydrogen peroxide (H_2O_2), Local anesthesia (L.A), tap water, sodium hypochlorite, Metronidazole and savlon while keeping formalin as control.

The fresh tissue (Goat tongue) sample was cut into multiple bits and placed in different containers for a period of 14 hours before transferring to 10 % formalin solution for 24 hours at room temperature. It is followed by conventional processing method with different grades of alcohol proceeded by staining with hematoxylin and eosin.

OBSERVATIONS AND RESULTS:

The tissue sections were assessed by three examiners under light microscope and the whole procedure was blinded.

Histomorphological criteria examined are elaborated below:

a) Cellular outline

b) Nuclear detail

c) Staining quality

d) Overall morphology.

Each Histomorphological criteria was rated on a scale of 1-4:

1. Poor
2. Satisfactory
3. Good
4. Excellent

Depending upon the scores obtained, total scores were taken and the values were used to group the tissues into following:

SCORING CRITERIA

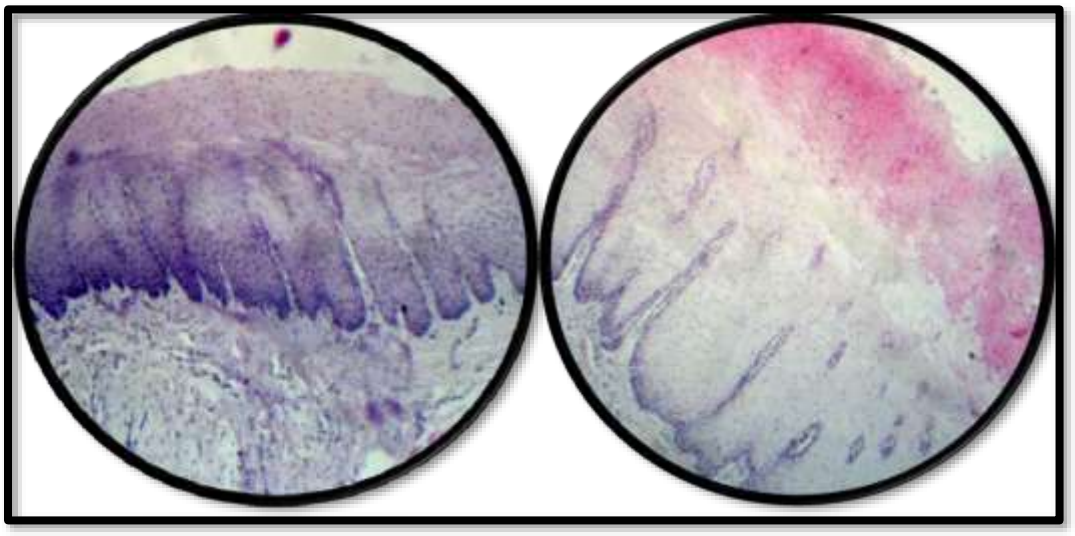
Excellent	12-16
Satisfactory	8-11
Poor	0-7

TRANSITIVE FIXATIVE USED	Staining Quality	Cellular Outline	Nuclear Details	Over All Morphology	Total Score (16)
Formalin	4	4	3	4	15
Local anaesthesia	4	3	2	3	12
Betadine	3	3	2	3	11
Savlon	3	3	2	3	11
Saline	3	2	1	2	8
Hydrogen peroxide	4	2	2	2	10
Metronidazole	2	2	1	2	7
Tap water	2	1	1	2	6

Sodium hypochlorite	3	1	1	1	6
Spirit	2	1	1	1	5

[Table-1]: The average values of three examiners

Fixation of tissues in 10% formalin solution gave the ideal results [Fig-1] which acted as the positive control for the study. All the transit fixatives were able to preserve the tissue over a period of 14 hours. Tissue fixed with L.A. [Fig-2] Betadine and Savlon showed good cytoplasmic and nuclear details. Similarly, in H_2O_2 fixed tissue sections, the cytoplasmic and nuclear details were satisfactory. On the other hand, tissue in Tap water, Saline and Metronidazole showed significant cellular swelling &poor staining with H&E, which indicates tissue autolysis. Other tissue sections had good overall morphology and also good nuclear, cytoplasmic details and staining quality except saline and spirit. To sum up the overall results, the tissue fixation ability was in the following order: Formalin > L.A > Betadine> Savlon> Normal Saline > H_2O_2> Metronidazole > Tap water> Sodium hypo-chloride> Spirit.



[Fig-2, 3]: Hematoxylin & Eosin section of tissue fixed in Formalin and L.A.

3. DISCUSSION

The fixation method is a crucial step in the histopathological process, as it determines the optimalconservationofthetissuebeforeitsanalysis.Thecurrentfixativeofchoiceisformalin. The use of formalin has a long history in tissue fixation; in 1893, Ferdinand Blum discovered the power of the formaldehyde fixative and began several experiments on the use of formalin in histology and pathology.[1] Formalin should be kept in every dental setup and clinics.

Formalin has been used for 150 years and represents an optimal compromise.[2]It is widely used for preservation of the morphology, antigenicity and molecular characteristics of most tissues, and is accepted by most pathologists after standardization of protocols. The formalin-fixed paraffin-embedded tissue stained with hematoxylin and eosin (H&E) is the "Gold Standard" and no other histopathology technique provides so much information so quickly and for such little cost.[3]

In dental clinics, rural areas where screening programmes, medical camps and public health service centres were conducted, doctors generally see large number of patients. Patients with suspicious lesions are advised for immediate biopsy. In certain situations formalin might not be readily available. In such cases, the biopsied tissues will be discarded or get damaged if left out for drying which poses difficulty in diagnosis.

Previously studies were carried out using sugar syrup, jaggery, molasses and honey as an alternative to formalin for fixation.[4,5] Formalin, a chemical used to preserve tissues for biological and histopathological examinations, is added to milk to retain its freshness and prevent it from spoiling.[6] Improvements in fixation occurred by using the combination of gluteraldehyde and H_2O_2.[7]

The decision of choosing the above said solutions is as they are readily available in the dental clinic/clinic rural. This attempt of ours is the first of its kind with no existing literature on the usage of the above said as transit fixatives.

It is heartening to know that some of the solutions available in a dental clinic/clinic give pleasant surprises! Fixation of tissue by L.A., Betadine and Savlon is an innovative attempt. These have all the novel qualities to be a good transit media.

4. CONCLUSION

Biopsy is the gold standard for histopathological diagnosis and it is very important to preserve the tissue in proper fixative for analysis. Biopsy of all the suspicious lesions is mandatory. If formalin is not available, the tissues can be fixed in the above said solutions for a period of 14 hours. Our study emphasizes the need and preservation of tissue in a life like manner as possible, so that the valuable human tissue can be used for diagnosis. Thus, we emphasize transit fixative shovel the novel qualities to fix and preserve the morphological details of the tissues for a period of time.

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