Global Scientific and Academic Research Journal of Dentistry and Oral Medicine
ISSN: 2584-2382 (Online)
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journal-gsarjdom-home/

PERIODONTAL PROBE- EYE OF A PERIODONTIST

BY

Dr.Hemalatha. D.M[1], Dr.Subair.K[2], Dr.Nanditha Chandran[3], Fidha Fathima[4], Fathima Nashva[5]

[1]Assistant Professor Department of Periodontics, Mahe Institute of Dental Science and Hospital, Chalakkara, Mahe-673310.
[2]Professor Department of Periodontics, Mahe Institute of Dental Science and Hospital, Chalakkara, Mahe-673310.
[3]Associate Professor Department of Periodontics, Mahe Institute of Dental Science and Hospital, Chalakkara, Mahe-673310.
[4]Third year BDS student Department of Periodontics, Mahe Institute of Dental Science and Hospital, Chalakkara, Mahe-673310.
[5]Third year BDS student Department of Periodontics, Mahe Institute of Dental Science and Hospital, Chalakkara, Mahe-673310.

Article History

Received: 01/08/2024
Accepted: 08/08/2024
Published: 10/08/2024

Vol – 1 Issue – 8

PP: -01-04

Abstract

Success of a treatment solely relies on the exact diagnosis of the underlying illness. In periodontics, diagnosis starts with an accurate examination of periodontal pocket. Periodontal probes which are the essential and first line of diagnostic instrument are of immense importance. A diagnostic tray is incomplete without a periodontal probe . Assessment by probing helps in education of bleeding of probing, pocket determination, clinical attachment loss, etc. These handy instruments play a vital role in a periodontist assessment skills. This review highlights on the history, classification, and an overall view on these instruments.

KEYWORDS: *Probes, probing, periodontal pocket, assessment*

INTRODUCTION

Periodontal probe is the primary tool used to evaluate the condition of the periodontium, either for screening purpose or to evaluate periodontal changes through the treatment process. Handle, Shank and calibrated working ends are main parts of periodontal probe[(1)]. The main motive of this article is to give a brief description about periodontal probes, its generation, and different methodology of probing. As our understanding of periodontal diseases are grown, the probes have advanced from the conventional unidimensional manual shape to the most complex computerized instrument. Probes are classified into different generation based on its development. First generation includes the conventional probes, whereas second and third generation includes the pressure sensitive probes and computerized probes respectively. Fourth and fifth-generation probes includes three-dimensional probes which is under development[(2)]. There are many probing technique such as walking stroke, probing proximal root surface, probing technique on anterior and posterior teeth[(3)]

HISTORY

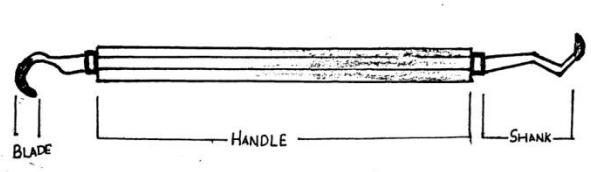
The Latin word "probo" which means "to test" is where the term probes originates[(4).] Initially, John M Riggs in 1882 described probes as a diagnostic instrument. F.V. Simmoton of the University of California, ST Francisco in 1925 first described periodontal probe and its uses. In 1958 Orban described periodontal probe as a "eye of the operator" beneath the gingival periphery. Glickman specified that "probe is an instrument with a tapered rod-like blade which has a blunt and rounded tip". Ramfjord in 1959 a round probe with a tip diameter of 0.4mm was designed and it is the most commonly used probe today[(5)]. The pressure probe with a standardized insertion pressure upto 30gmwas introduced by Vander Veiden and De Vries(1978).A new computerized probe known as Florida probe was introduced by Gibbs et.al (1988)[(2)] . The first classification of periodontal probes was given by B.L Philstrom in 1992 {first to third generation}
Classification was extended by Watts including fourth and fifth generation of probes in 2000.[(6)]

BASIC DESCRIPTION OF PROBES

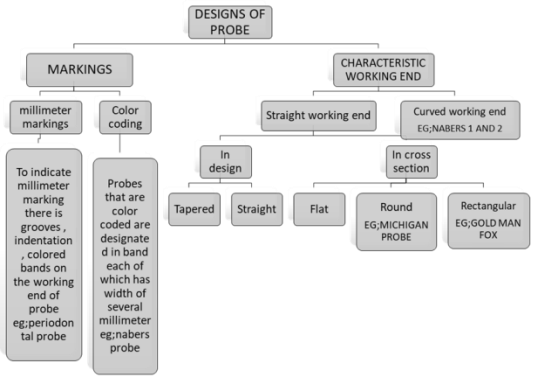
A standard probe is an instrument that resembles a tapered rod and is measured in millimeters, with blunt, rounded tip[(1)]. It consists of three parts;

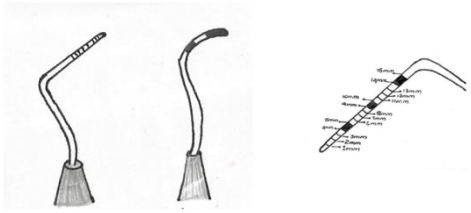
*Corresponding Author: **Dr.Hemalatha. D.M, M.D.S.**

1) The handle
2) Shank
3)Blade



DESIGNS OF PROBE[3]





A B C

A) Williams probe with millimeter marking and straight working end
B) Nabers probe with color coding and curved end
C) UNC-15 periodontal probe with millimeter and color coding

USES OF PERIODONTAL PROBE

Periodontal probe used chiefly to detect and measure periodontal pockets and clinical attachment loss and determine extend of inflammation[7]. They are intended to asses periodontal status and evoke treatment plan[8].

For example: furcation areas are examined using Nabers probe. Probes which are used for describing clinical attachment level

Furthermore, they are utilized to find width of the attached gingiva, detect calculus, measures gingival recession and size of intra-oral lesions. Identify tooth and soft tissue anomalies, determine mucogingival relationship and bleeding tendencies, and measure furcation involvement.[7]

PROBING TECHNIQUE[8]

To evaluate the condition of the gingiva, probing is the process moving the probe tip along the junctional epithelium inside the sulcus or periodontal pocket. The walking stroke is a sequence of bobbing strokes that should be between one or two millimeter long and it must be long. It consists of up and down stroke . It is used to cover the whole circumference of sulcular pocket base. Start probing from the distal-most aspect of the tooth

ADAPTION OF PROBE FOR INDIVIDUAL TEETH[6]

A] Anterior teeth
Incisal insertion may be at the distal line angle or from the middle of facial or lingual direction do along the distal line angle and probe the other half of the teeth.

B]Premolars and molars
Orient probe at the distal line angle and probe in a distal direction across the distal surface until the side of the probe contacts the contact area then slant the probe to continue under the contact area repeat the same in the mesial direction
C]Proximal surface

Roll the instrument handle between the fingers to keep the side of the probe tip adapted to the teeth surface and thoroughly examine the col area under each contact.

DRAWBACKS

Periodontal probe has its own limitation. The major two are operator error and reading error. The presence of an overhanging restoration or crown contour or calculus on the tooth or root surface are examples of naturally occurring that might cause reading errors, whereas in operator error, which includes things like misaligning the probe, applying too much pressure, misreading the probe, actually documenting the data and computing the attachment[9].

NIDCR criteria
National institute of dental and craniofacial research(NIDCR)

LIMITATION	CONVENTIONAL	NIDCR CRITERIA
Precision	1.0mm	0.1mm
Range	12.0mm	10.0mm
Probing force	Not standardized	Constant
Applicability	Noninvasive	Noninvasive
Reach	Easy to use	Easy to use
Angulation	Subjective	Guidance system
Read out	Voice dictation and recording	Direct electronic reading
Security	Easily sterilized	Completely sterilized

TYPES OF PROBES[6]

PROBE MARKING	EXAMPLES	DESCRIPTIVE FEATURES

*Corresponding Author: **Dr.Hemalatha. D.M, M.D.S.**

[mm]		
Marks at 1-2-3-5-7-8-9-10	Williams University of Michigan with Williams marks Glickman Merritt A and B	Round, tapered [available with color code]. Round narrow diameter, fine. Round, with longer lower shank. Round, single bend to shank.
Marks at 3-3-2	University of Michigan Premier D Marquis M-1	Round, fine, tapered, narrow diameter.
Marks at 3-6-9-12 3-6-8-11 [and other variations]	Hu-FRIEDY QULIX Marquis Nordent	Round, tapered, fine. Color-coded
Marks at each mm to 15mm	Hu-Friedy PCPUNC 15	Round Color-coded at 5-10-15
Marks at 3.5-5.5-8.5-11.5	WHO probe [World Health Organization]	Round, tapered, fine with ball end Color coded
No marks	Gilmore Nabers 1N,2N	Tapered, sharpen than other probe

Generations of Periodontal probe:
The first classification of periodontal probe was given by B.L.Philstrom in 1992 based on development which include

1. First Generation [manual probe]
2. Second Generation[pressure sensitive probe]
3. Third Generation[computerized probe]

Classification was extended by Watts in 2000 which adds

1. Fourth generation[3-D probes]
2. fifth generation[ultrasonographic probe]

Fourth and fifth-generation probes are currently under development

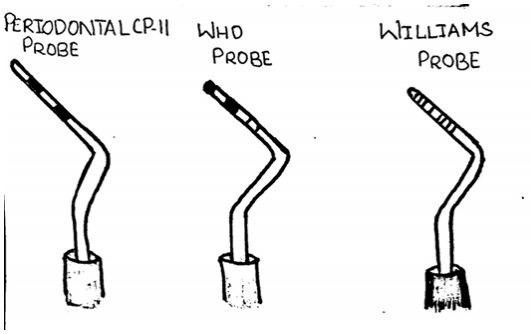
First generation(conventional probe):
First generation probe was introduced by Charles H.M. Williams in 1936. Williams periodontal probe is the benchmark for all periodontal probes[10]. In 1978 professor George S Biagre ana Jukka Ainamo designed the community periodontal index of treatment needs [CPITN]. It is recommend in patient with CPITN index during screening and monitoring[11].

The advantage of the first generation are that they are easily available and affordable and disadvantages are that the power of the detector cannot be controlled, uniform probing force cannot be maintained inter-tooth, and interpersonal variation are possible [8].

Example; Williams probe markings at 1-2-3-5-7-9and 10mm

Marquis color-coded probe with marking at each millimeter
UNC -15 probe a 15mm long probe with color coding at 5-10-15mm

Michigan o probe with marking at 3-6-8mm
WHO probe which has 0.5mm ball at tip and millimeter marking at 3.5,8.5 and 11.5mm and color coding from 3.5 to 5.5mm[2]



Second generation:
Second generation probe pressure sensitive probe. Pressure sensitivity in the second-generation equipment allows for better standardization of probing pressure[11]. Standardizing the probing force is 25gm\0.75N [12].

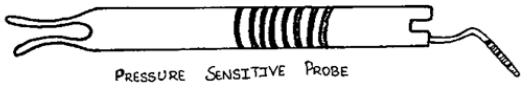
Advantages of this generation probes include the strength of traditional probes, and maintaining a standardized pressure. Disadvantage include reduce tactile sensitivity. [13]

Example[2]; Hasell et al [1973] reported that “not much co-relation is found between force and depth”

Armitage [1977] designed a probe with a force of 25 ponts with constant findings.

Vander veldon and DeVries [1978] devised an instrument consisting of a cylinder and piston connected to air pressure system.

Vine valley probe [Polson 1980] pressure sensitive probe with a range of 5-100gm.



Third generation:
Third generation probe was introduced to reduce demerit of second generation such as in reading the probe, recording data, calculating attachment level, etc.. This generation

*Corresponding Author: **Dr.Hemalatha. D.M, M.D.S.**

incoporates computer-assisted directed data acquisition for increase probe precision and lesion examine bias[4].

The advantage include all probing measurement are directly recorded and marked in the computers and printed data are obtained and disadvantage are that these are very costly[8]. Examples[2];

Jeffcoat et al [1986] probe with automated CEJ detection or a precision of 0.2mm.

Birek [1987] – occlusal or incisal surfaces as landmarks.

Gibbs's et al [1987] Florida probe

Interprobe with fiber optic technology.

Perioprobe with disposable probe sleeve.

Foster miller probe

Fourth Generation:

Fourth generation probes are three dimensional probes. These probes, which are presently in development to record successive probe position along the gingival sulcus[4].

The advantage of this generation are that sequential position of probe can be measured and placement method is significant limitation[8].

Fifth Generation:

Fifth generation probes aims to be non invasive and three dimensional. These probes identify the attachment level without penetrating it.

Required operator skills are the biggest impact of the fifth generation[8].

Fifth generations probes [Non invasive three dimensional probes] these will add ultra sound or another device to the fourth generation three dimensional probes[10].

CONCLUSION

The calibrated probe used primarily to asses the periodontal status for preparation of treatment plan and measure pocket depth and clinical attachment level.

The field of periodontics is continuously changing, so periodontal probe which is described as the eye of operator beneath gingival margin, should strictly provide the potential for error free determination of pocket depth .With additional exploration and development for the approach of fresher error free probes may resolve the issues and those yet to be realized

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*Corresponding Author: **Dr.Hemalatha. D.M, M.D.S.**