



Periodontal Probes Enhancing Our Clairvoyance: A Review

Dr.Hemalatha D.M, Dr.Arjun.M.R, Dr.Vishnusripriya. J, Ms.Eswari Nivetha. K, Ms. Farheen Faisal,

Department Of Periodontics, Mahe Institute Of Dental Sciences, Chalakkara, Mahe-673310

Abstract:

Periodontal probes are instruments that are commonly used in routine dental examination to evaluate periodontal disease status. Probes are exploring instruments that are highly sensitive and specific diagnostic tool ^[1] which is used to diagnose, formulate treatment and predict the prognosis of therapy done. Evolution of periodontal probes have led to increased accuracy in the determination of periodontal pocket depth and assessment of periodontal disease activity non-invasively. The purpose of this article is to give a brief summary about periodontal probes, its uses and limitations and also about its types and probing methods.

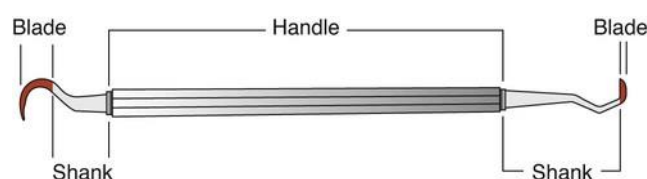
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History:

The word “probe” is derived from the Latin word “probos” which means “to test” ^[2]. For the first time in 1882, John W. Riggs described probes. Periodontal probes and its uses were first described by F.V. Simonton of the University of Carolina. Glickman stated that the probe is an instrument with a tapered rod-like blade which has a blunt and rounded tip. The probes used today were developed by Ramfjord in 1959. Orban et al described the probe as the “eye of the operator beneath the gingival margin”. ^[9] The periodontal probe is an essential part of a complete dental examination.

Basic Description of a Probe: ^[3]

Most probes are made from spring tempered stainless steel with millimeter markings on the probe's tip. A probe is a tapered rod like instrument made of three parts: the handle, shank and working end.



Carranza clinical periodontology, 13th edition chapter 50,

The handle portion is held by the operator. The shank is the connection between the handle and the working end which often comes with an angulation. The working end is usually at an angle to the contact surface and often comes with markings on its tip.

Periodontal Probe Types and Classification:

Two types of probes are available. They are the traditional or standard manual type and the controlled force or automated type probes. In 1992, B.L Philstrom described three generations of probes. ^[10]

1. Conventional manual probes
2. Constant-force controlled pressure probes
3. Constant-force automated

In 2000, Watts extended this classification by adding the fourth and fifth generations. ^[11]

Periodontal Probe Generations:

First Generation:

Invented in 1936 by periodontist Charles H.M Williams, the Williams periodontal probe is the prototype for all first generation probes. ^[8] The CPITN probes are used when patients present with CPITN index. ^[13]

Examples of first generation probes are William's probe (which have markings at 1mm, 2mm, 3mm, 5mm, 7mm, 8mm, 9mm and 10mm), CPITN probe, Glickman probe, and Naber's probe which is used to assess furcation involvement.

The advantages of the first generation probes are that they are easily available and inexpensive, and the disadvantages are that the probing force cannot be controlled.

Second Generation:

Second generation probes are also known as constant pressure probes and are pressure sensitive. Probing pressure should be standardized and not exceed 0.2 N/mm^2 . ^[10]

Examples of the second generation probes are the True Pressure Sensitive probes (TPS) introduced by Hunter in 1994 which is the prototype of second generation probes and the Yeaple probe which is a modification of Polson's electric pressure-sensitive probe.

Advantages of this generation of probes include standardized probing forces and disadvantages include decreased tactile sensitivity.

Third Generation:

Third generation probes include computer assisted direct data capture which allows for greater probe precision. The Foster-Miller probe is the prototype of the third generation probes, invented in 1986 by Jeffcoat et al. ^[12] This probe has controlled probing pressure and automated detection of CEJ. Other probes in this generation are Florida probe and the Interprobe.

The advantages of the third generation probes are that they are printout data obtained and disadvantages are that these probes are very expensive.

Fourth Generation:

Fourth generation probes are currently under development. These are three dimensional (3D) probes. Advantages of these probes are that sequential position of probes can be measured. Its invasive method is a major disadvantage.

Fifth Generation:

These are devised to be non-invasive and are also three dimensional. The only probe available in this generation is the Ultrasonography (US) probe which provides information regarding the condition of gingival tissues. Disadvantage of fifth generation probes is that operator skill is necessary.

Probing Techniques ^[4]:

Probing is the act of walking the tip of the probe along the junctional epithelium within the sulcus/ periodontal pocket to assess the health of the tissues. The walking stroke is a series of bobbing strokes along JE, consisting of up and down stroke that should be approximately 1-2mm in length.

Interproximal technique: When two adjacent teeth are in contact, interproximal technique of probing is used to explore the area directly beneath the contact area.

Probing of the Anterior Tooth:

Start with distofacial/ distolingual line angle. Walk toward the distal surface. Assess beneath contact area then tilt the probe and press down to touch the junctional epithelium. Assess the facial surface. Proceed with a series of walking strokes along the facial surface. Walk towards the mesial surface. Gently probe the area.

Probing of the Posterior Tooth:

Assess beneath the contact area, tilt to reach the contact area, press down to access the junctional epithelium. Re-insert at the distofacial line angle. Make a series of walking strokes towards the mesial surface to reach the contact area. Tilt the probe and extend the tip beneath contact area. Press down to touch the junctional epithelium.

National Institute of Dental and Craniofacial Research (NIDCR) criteria for overcoming conventional probing: ^[7]

LIMITATION	CONVENTIONAL	NIDCR CRITERIA
Precision	1.0 mm	0.1 mm
Range	12.0 mm	10.0 mm
Probing force	Non-standardized	Constant
Applicability	Noninvasive	Noninvasive
Reach	Easy to use	Easy to use
Angulation	Subjective	Guidance system
Readout	Voice dictation and recording	Direct electronic reading
Security	Easily sterilized	Completely sterilized

Assessment of Probing Depths:

It is a measurement of depth of the sulcus of the periodontal pocket. It is determined by measuring the gingival margin to base of the sulcus with a probe. Probing depths are recorded on a periodontal chart. ^[6]

Peri-implant probing:

Peri implant probing differs from natural teeth probing. ^[17] The results obtained from peri implant probing is not same as probing in natural teeth because of presence of supra crestal tissue fibers into cementum of root surface which provides resistance to probing. Lang et al ^[16] concluded that probing around non submerged implants was a good technique for assessing the status of peri-implant mucosal health or disease. Peri-implant probing is more sensitive to force variations than periodontal probing. Hence probing is always accompanied by a plastic probe.

Trans-gingival probing:

Also known as sounding. Transgingival probing is a procedure done under local anesthesia which is used to confirm the extent and Configuration of the intrabony component of the pocket or of the furcation defects. ^[15]

Uses of Probes:

Probes are used to measure the depth of pockets ^[3] and to determine their configuration. They are designed to assess the periodontal status to elicit treatment plan. Probes help in determination of extent of inflammation. For example: Bleeding on probing. ^[4] CAL or Clinical Attachment Level is described with the help of probe. Naber's probe is used to examine furcation areas.

Periodontal probes help in muco-gingival examination, to measure the level of gingival recession, evaluate exudate, to determine consistency of gingival tissue, to detect subgingival deposits, root irregularities, etc. Probing depth measurement ^[5] is an essential examination. Deeper probing depth indicates inflammation and indication of loss of attachment.

Limitations of Periodontal Probes:

There are numerous factors which influence the use of probes. They include factors such as probe type, shape, thickness, angulation of probe, and probing force. The above mentioned factors are seen in the first generation probes.

The accuracy of marking intervals, condition of tissue at depth of pocket and pain around the depth also influence and limit the actions of probe.

The major drawback of third generation probes are reduced tactile sensitivity. Also any inflammation in the gingival tissue may alter the accuracy of probing measurements.

SUMMARY:

The best tool for measuring the extent and severity of periodontal disease and associated symptoms is the periodontal probe. Three factors should therefore be considered for obtaining accurate results: the operator, the probe used and the environment. The essential factors that increase the accuracy and reproducibility of both operator and probe are a constant probing pressure, which may be obtained by a designated fixed constant probing force and a fixed tip diameter and a clear marking system on the probe blade. Furthermore, examiners may have a higher reproducibility with a particular type of probe, despite the training status of the operators. Recent advances in probes have yielded reduced errors in probing measurements and have led to non invasive assessment of active periodontal disease.

CONCLUSION:

Periodontal probes are specific diagnostic tool that are used to assess the extent and severity of the periodontal disease. Probes helps not only with the diagnosis of periodontal disease but also with the evaluation of the treatment outcomes and monitoring. Thus, knowledge of the methodology or obtaining accurate and reproducible probing measurements is essential.

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