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Periodontal Charting: Track Your Progress for Healthy Smiles

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Abstract:
Periodontal charting is a crucial diagnostic and monitoring tool in periodontology, aiding in the assessment of periodontal health and disease progression. This document explores the significance of periodontal charting, detailing the information recorded, including probing depths, clinical attachment levels, bleeding on probing, mobility, and implant placement. The evolution from manual to electronic charting has improved accuracy, efficiency, and patient outcomes. Recent technological advancements, such as 3D visualization, QR code integration, and direct data storage, have further enhanced periodontal assessments. These innovations enable more precise tracking of periodontal disease and treatment effectiveness, facilitating improved patient care and clinical outcomes.

Keywords: Periodontal charting, Perio tools, Periodontal assessment

INTRODUCTION

Periodontology is a branch of dentistry that concentrates on the tissues that support the teeth. Periodontal disease develops in a way that can be unpredictable, with episodes of worsening and improvement occurring at different times.(1) Conducting a thorough periodontal assessment is crucial for delivering effective supportive periodontal therapy. The success of this assessment can be attributed to a range of innovative criteria and significant tools that have evolved over time, all aimed at enhancing diagnosis and evaluation. While bacteria were believed to be the primary culprits, they alone were not enough to trigger disease; factors like the environment, systemic conditions, and host responses were also considered important contributors.

To gain a deeper understanding of this complexity, different assessment methods and enhanced diagnostic tools were created and put into practice.(2).There is a significant demand for fresh research in diagnosis to support the early detection of the well-known underlying microbial flora and its role in the disease process, along with the weak points that could lead to future breakdowns. Modern dentistry has reached remarkable heights in innovation and has made significant strides in efficiency, effectiveness, and technology. Technology has significantly enhanced the value of dentistry and encouraged dentists to adopt procedures that are less stressful for patients.

Periodontal disease develops in a way that can be unpredictable, with episodes of worsening and improvement occurring at different times. To gain a deeper understanding of this complexity, different assessment methods and enhanced diagnostic tools were created and put into practice. Perio-tools.com is

an online platform offering a range of periodontal tools designed to assist with the assessment, diagnosis, and management of periodontal diseases. Perio-tools.com offers a range of languages, ensuring that its resources are accessible to a wide international audience. The platform is dedicated to ongoing enhancement and values user feedback to refine its tools and services. It has been utilised since 2010. (3) One important aspect is periodontal charting, which is now commonly used in periodontics and oral implantology.

Periodontal charting, often referred to as probing or periodontal screening, is a detailed process that assesses the health of our gums. A periodontist or dentist uses a specialised tool called a Periodontal Probe to accurately measure the spaces between your teeth and the surrounding gums. Periodontal charting is the best way to tell apart patients who are healthy in terms of their gums and those who are dealing with periodontal disease.(4)

INFORMATION RECORDED IN THE CHART

- General condition of periodontal health
- Presence of plaque deposits
- Depths of periodontal pockets
- Loss of clinical attachment levels
- Mobility or furcation involvement in the tooth
- Assessment of bleeding gums.
- Implant placement
- Record of missing tooth

WHERE CAN PERIODONTAL CHARTING BE USED?(5)

It's important to create a periodontal chart when there are signs of periodontitis. The following symptoms are included among these factors:

Gums bleed when brushing or eating(5)

- Gums appear red and swollen
- Gum pain
- Persistent bad breath
- Alterations in the way teeth align
- Heightened sensitivity in teeth
- Teeth appearing longer with exposed roots
- Teeth that feel loose or are shifting

HOW TO FILL THE PERIODONTAL CHART?

MANUAL

In this method, the periodontist measures the depth of the periodontal pockets and interprets the data using a standard periodontal probe.(5)

Furthermore, the periodontist enters the collected data into the periodontal chart on their own.

COMPLETING AN ELECTRONIC PERIODONTAL CHART

This is the latest approach to managing periodontal health.

Measurements are taken with an advanced computer probe that automatically identifies all indicators. The data collected is quickly processed, organised, and saved using specialised software.(5)

RECORDING CLINICAL PARAMETERS

- We need to record the gingival margin, the pocket probing depth and the attachment level will then be calculated.(6)
- The "Gingival Margin" refers to the distance between the clinical gingival margin and the cemento-enamel junction.
- The "Probing Depth" refers to the distance between the gingival margin to the base of the periodontal pocket or the sulcus.
- We will calculate the "Attachment Level" for each site by subtracting the gingival margin measurement from the probing depth measurement.(7)

What must be the angulation of the periodontal probe?

The probe must be placed along the root surface of the tooth to measure the probing depth. (8)

1. The probe must be angulated in a mesio-distal direction and it must be parallel to the long axis of the tooth.
2. Any Angulations other than the mesio-distal like the buccal-lingual direction should be avoided to prevent any error.

Measuring the depth of probing

Measurements are taken at six locations around each tooth to ensure complete coverage. (8) The bleeding on probing is also recorded.

The pocket probing depth at healthy sites should remain at or below 3 mm.

In areas with severe infection, probing depths may extend up to 12mm along with bone loss referred to as periodontitis.

Measurement of Clinical Attachment Level

The clinical attachment level is calculated by measuring the distance between the cemento-enamel junction and the base of the pocket or the sulcus.

Attachment level (mm)= probing depth (mm) - gingival margin (mm).(9)

Periodontium in a state of health

- The cementoenamel junction is located just below the gingival margin and right above the attachment level.
- Maintaining a healthy periodontium helps avoid attachment loss.
  When probing depth and the gingival margin are equal, then the attachment level is zero.(10)

Periimplant sites in a state of health

The margin of the supra structure is positioned slightly lower than that of the periimplant mucosal margin. In healthy periimplant areas, there is no loss of alveolar bone.(11)

Peri-implant tissues in the aesthetic zone

The margin of the suprastructure is positioned lower than the periimplant mucosa.
In the aesthetic zone, healthy periimplant sites show no loss of alveolar bone. (11)

GINGIVAL OVERGROWTH

In certain clinical situations, the CEJ might be located beneath the gingival margin and above the clinical attachment level.(12)

- This is clinically observed in situations involving gingival enlargement or hyperplasia.
- However, Pseudo pockets refer to pockets that measure 4mm or more but without attachment loss.

PERIODONTAL POCKET (13)

- To measure the pocket probing depth, the distance from margin of the gingiva to the base of the sulcus is measured. Periodontal pockets measuring over 4mm after active periodontal therapy are referred to as residual pockets.
- **Peri-implant pocket:** The depth of periimplant probing is assessed by the distance from the mucosal margin to the base of the periimplant pocket. (13)
- **Gingival recession :** Gingival recession is the apical migration of junctional epithelium. It is calculated by the summation of pocket probing depth and clinical attachment level. Attachment Level = Probing Depth +Gingival Margin.
  Peri-implant recession Periimplant recession happens when the mucosal edge is positioned lower than the suprastructure edge.(13)

FURCATION INVOLVEMENT

- Furcations of all molars and first premolars of the upper jaw should be assessed with a Naber's Probe
- The horizontal component of probing is graded (0 - 3) according to the criteria (Hamp et al., 1975) (14)

TOOTH MOBILITY

To test tooth mobility, use two single-ended instruments outlined by Miller (1950) is used to infer the grades of mobility. (15)

HOW TO USE A PERIODONTAL CHART? (16)

MEASUREMENT OF BLEEDING ON PROBING

Bleeding and pocket depth

A periodontal chart can indicate the presence of gingival diseases based on the amount of bleeding and the depth of the pocket. The criteria is in detail mentioned in the periodontal chart.

MEASURING ORAL HYGIENE INDEX

The Oral Hygiene Index (OHI) is a measure of a patient's oral hygiene. It records the presence or absence of plaque on the tooth surfaces.

SPACE FOR NOTES

Any additional factor that needs to be added in the periodontal chart such as pus discharge, halitosis, etc. can be included in this space.

RECORDING A MISSING TOOTH

By a click on the tooth, it will visually cross out the tooth as well as fade out all its values

RECORDING PLACEMENT OF IMPLANT

Once we click on the box assigned for the implant, the implant placement at that particular site of tooth is recorded.

HOW TO SAVE THE CHART (16)

We can download the data entered in the online periodontal chart directly to your browser's downloads folder as a file.

You can save the online periodontal chart as a PDF.

A. Clicking the 'Print' button brings up the print interface, allowing to choose Adobe PDF.

By clicking OK, the user can select a file name and location for the PDF file.

THE NEW UPDATES STORE(16)

1. RETRIEVE THE DATA

The online periodontal chart now enables direct data saving to a physical hard disc, providing secure storage for sensitive patient information without depending on cloud or online databases. Once the chart is downloaded, the data gets saved as a txt file in the browser's download folder and then we can reload it into the online periodontal charting form at a later time.

2. SHOW AND RESET PERIODONTAL CHART

Load and show up to two periodontal charts from the hard drive.

To reset the periodontal chart shown, just SHIFT-click on the appropriate button.

3. COMBINING TWO PERIODONTAL CHARTS

The online periodontal chart now offers the option to overlay two examinations, enabling a thorough analysis of treatment progress for each site and tooth.

4.EXAMINATION

The periodontal chart now includes an enhanced feature for analysing clinical data, enabling direct comparisons of findings, like those observed before and after starting therapy.

The portrayal of the complete periodontal profile stands out, offering a clear picture of oral hygiene, pocket depth, and overall inflammation.

5. 3D VISUALISATION OF PROBING DEPTHS

This new feature enables dynamic 3D visualisation of individual findings and allows for a comparative presentation of overlay findings. The visualisation clearly shows the impacted areas in mm^2 and percentage.

6. QR CODE

The updated online periodontal chart now makes it easier to access periodontal findings, including a feature that allows you to transfer this information to mobile devices using QR codes. This function offers

great flexibility and ensures data protection since no information is stored online and the transfer happens directly.

7. MOVE

The existing extension enables direct data transfer from the online periodontal chart to the online periodontal risk assessment. This feature makes data management much easier by enabling fast, anonymised, and summarised data transfer to the next stage of analysis without the need for online storage.

8. UPCOMING ENHANCEMENTS INTRODUCING MORE OPTIONS FOR DOCUMENTING GINGIVAL RECESSIONS

The upcoming upgrade will greatly improve how we measure gingival recession.

A. Introduced a feature to eliminate negative signals for sites experiencing gingival recession.

B. Users can toggle this feature on or off as they wish.

9. IMPROVING CLINICAL ASSESSMENTS THROUGH THE INCLUSION OF MUCOGINGIVAL LINE AND GINGIVAL PHENOTYPE INFORMATION.

Clinicians can now access the mucogingival line and document the gingival phenotype, which is essential for planning oral implant placements and surgeries. This new feature will offer important insights into the structure of the gums for better treatment planning.

This tool is designed to enhance clinical outcomes and the quality of patient care.

10. PERMITTING FAVOURED COLOURS OF IMPLANTS, ALONG WITH CONSIDERATIONS FOR PERIODONTAL POCKETS, GINGIVAL MARGIN, AND CLINICAL ATTACHMENT LEVEL.

Being able to choose different colours for oral implants, periodontal pockets, gingival margins, and clinical attachment levels allows users to customise colour schemes according to their preferences or particular clinical needs.

Benefits:

- Simplify data input
- Reduce mistakes
- Accelerate charting
- Enable practitioners to utilise their preferred method of data notation.
- This documentation process is simpler, more efficient, and flexible enough to meet different user needs.

Conclusion

Periodontal charting is an essential tool for diagnosing and planning treatment in periodontics, offering valuable insights into periodontal health and disease. Recent advancements like electronic charting, 3D visualisation, and features such as QR codes and data transfer enhance the efficiency and effectiveness of the process. Dental professionals have the opportunity to enhance patient care by utilising these innovative tools and upcoming advancements. (17)

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