Universidad Europea

TRABAJO DE FIN DE GRADO

Grado en Odontología

TRATAMIENTO Y MANTENIMIENTO DE LA ENFERMEDAD PERIODONTAL AGUDA Y CRÓNICA.

Madrid, 2020/2021

Número identificativo 42

RESUMEN

Introducción: La terapia periodontal es un aspecto integral de la odontología y lo ha sido durante muchos años, lo que se ha demostrado en la evolución continua de la Clasificación Periodontal con cambios notables que se realizaron en 1977, 1986, 1989, 1999 y 2018. El tratamiento periodontal tiene como objetivo preservar, mejorar y mantener la dentición natural del paciente mientras que los programas de mantenimiento tienen como objetivo mantener la estabilidad periodontal a lo largo del tiempo. Varios estudios han demostrado que la terapia periodontal sin un programa de mantenimiento bien diseñado da como resultado una recaída de la mala salud bucal que conduce a periodontitis recurrente. **Objetivos**: Conocer las opciones terapéuticas con que cuentan las diferentes fases del tratamiento de la periodontitis. **Materiales y métodos**: Mediante el uso meticuloso de artículos científicas confiables, escritas en inglés o español, cumpliendo con los criterios de inclusión y exclusión. **Conclusiones:** El tratamiento de la periodontitis consta de 4 pasos, el cual se debe llevar a cabo mediante un abordaje terapéutico escalonado preestablecido que, según el estadio de la enfermedad, debe ser incremental.

Palabras clave: *Enfermedad periodontal, periodontitis, mantenimiento periodontal.*

ABSTRACT

Introduction: Periodontal therapy is an integral aspect of dentistry and has been for many years, which has been demonstrated in the continuous evolution of the Periodontal Classification with notable changes that were made in 1977, 1986, 1989, 1999 and 2018. Periodontal treatment aims to preserve, improve and maintain the patient's natural dentition while maintenance programs aim to maintain periodontal stability over time. Several studies have shown that periodontal therapy without a well-designed maintenance program results in a relapse of poor oral health leading to recurrent periodontitis. **Objectives**: To know the therapeutic options available to the different phases of periodontitis treatment. **Materials and methods**: Through the meticulous use of reliable scientific articles, written in English or Spanish, meeting the inclusion and exclusion criteria. **Conclusions**: The treatment of periodontitis consists of 4 steps, which must be carried out through a pre-established staggered therapeutic approach that, depending on the stage of the disease, must be incremental.

Key words: Periodontal disease, periodontitis, periodontal maintenance.

INDICE

1. Introducción……. 1

1.1 Enfermedad periodontal……... 1

1.1.1 Factores que se contribuyen a la causa……... 3

1.1.2 Análisis crítico de las diferentes clasificaciones periodontales empleadas hasta la actualidad…… 6

1.1.3 Principales adiciones a la clasificación de 1999……... 7

2. OBJECTIVOS…… 28

2.1.1 Objetivo principal…… 28

2.1.2 Objetivo secundario…… 28

3. MATERIALES Y MÉTODOS……... 29

3.1.1 Criterio de búsqueda……..... 29

3.1.2 Principios de exclusión……... 30

4. DISCUSIÓN…….. 31

4.1 Primera fase del tratamiento de la periodontitis……... 31

4.2 Segunda fase del tratamiento de la periodontitis……..... 34

4.3 Tercera fase del tratamiento de la periodontitis…….. 41

5. CONCLUSIÓN……... 47

6. RESPONSABILIDAD SOCIAL……..…. 49

7. BIBLIOGRAFÍA……..... 50

8. ANEXOS…… 57

1. INTRODUCCIÓN.

Para ayudarnos a comprender mejor el desarrollo de una patología periodontal debemos de conocer primeramente la estructura que comprende al periodonto en si, para de esa forma comprar este, tanto en estado de salud como en presencia de patología. El periodonto se define etimológicamente por (peri = alrededor, odontos = diente) comprendiendo los siguientes tejidos: la encía, el ligamento periodontal, el cemento radicular y el hueso alveolar propiamente dicho.

1.1 ENFERMEDAD PERIODONTAL.

La enfermedad periodontal es un proceso patológico de etiología multifactorial inducido por bacterias, con una prevalencia estandarizada por edad del 11,2% y algunos estudios sugieren que las enfermedades periodontales pueden afectar hasta el 90% de la población mundial. [1]

La enfermedad periodontal comprende la infección y la inflamación del periodonto de la cavidad oral que afecta al tejido blando de la boca y en sus etapas iniciales, como también puede destruir el hueso que rodea los dientes en etapas más posteriores, lo que con el tiempo conduce a la perdida dentaria. En su etapa temprana se denomina gingivitis, definida como la inflamación del tejido gingival causada por la acumulación de placa bacteriana, lo que conduce a encías rojas e hinchadas que son propensas al sangrado. Cabe señalar que, en esta etapa, no hay daño irreversible del tejido duro. Si la gingivitis no se trata, progresa a una forma más grave conocida como periodontitis, cuando la encía y el hueso se separan de los dientes y forman bolsas, lo que permite que los desechos bacterianos se acumulen en este espacio y conducen a más inflamación e infección. Una vez iniciado este proceso, las toxinas producidas por las bacterias en la placa, así como los mecanismos de defensa del cuerpo

encargados de combatir la infección, comienzan a descomponer el hueso y el tejido conectivo que sostiene el diente en su lugar. A medida que pasa el tiempo, el proceso continúa, la destrucción continúa y se obtienen bolsas más profundas. Con el tiempo los síntomas son más graves e incluyen; retracción gingival, movilidad dentaria e incluso la perdida de los mismo por ausencia de soporte óseo. [1]

Según la Academia Estadounidense de Periodontología, las enfermedades periodontales agudas son afecciones clínicas de inicio rápido que involucran el periodonto o estructuras asociadas y pueden caracterizarse por dolor o malestar, destrucción de tejidos e infección [2]. Dentro de las lesiones periodontales agudas, podemos distinguir las siguientes: absceso gingival, absceso periodontal, enfermedades periodontales necrotizantes y lesiones endoperiodontales. Los abscesos tanto gingivales como periodontales se agruparon dentro de una misma categoría, la cual denominaron: abscesos periodontales. Las lesiones agudas periodontales entran dentro de las pocas situaciones clínicas en periodoncia en la que los pacientes buscan atención odontológica de urgencia, principalmente por el dolor asociado a las mismas. Debido a la rapidez con que estas lesiones progresan, puede ocurrir una destrucción acelerada de los tejidos periodontales durante su curso que en ciertas ocasiones pueden tener incluso repercusiones a nivel sistémico en los pacientes, lo cual enfatiza la importancia del diagnóstico y el tratamiento oportuno. Otra de las patologías de carácter agudo incluida en la ultima clasificación son las enfermedades periodontales necrotizantes que pese a tener una prevalencia baja, su importancia queda muy clara, ya que representa la condición más severa que se asocia a la biopelícula dental, manifestándose con una rápida destrucción de los tejidos de soporte. Las lesiones endoperiodontales comparándolas con el resto de las

patologías agudas son las menos frecuentes en la practica clínica, pero podrían agravar considerablemente el pronóstico de cualquier diente por lo que se convierte en uno de los desafíos a los que nos enfrentamos los clínicos por estos requerir de una evaluación y tratamiento multidisciplinar. [3]

1.1.1. Factores que se contribuyen a la causa:

- La principal causa de la enfermedad periodontal es la inadecuada higiene bucal y la ausencia de tratamiento en pacientes con gingivitis en estadio temprano. La falta de una buena higiene bucal significa que se puede formar más placa bacteriana y, con el tiempo, conduce a la formación de sarro/cálculo lo cual fomenta el crecimiento de la placa bacteriana hacia la raíz de los dientes. La gravedad y la velocidad a la que progresa la periodontitis pueden depender de; el tipo de bacterias presentes, la capacidad defensiva individual, la presencia o ausencia de factores de riesgo como el tabaquismo o patologías sistémicas, los factores genéticos o el consumo de ciertos tipos de medicamentos.

- Edad – la enfermedad periodontal tiene una correlación positiva con la edad. Algunos estudios (Centro para el Control y la Prevención de Enfermedades de los Estados Unidos) estadísticos muestran que en más del 70% de los estadounidenses mayores de 65 años se ha diagnosticado periodontitis. Este factor de la edad representa para muchos autores el efecto acumulativo de la exposición prolongada a factores de riesgo verdaderos. [4]

- Fumar – fumar no sólo está relacionado con el cáncer de pulmón u otros órganos corporales, sino que también es realmente perjudicial para los dientes y la cavidad oral en general. El consumo de tabaco es uno de los factores de riesgo más significativos en el inicio y desarrollo de la enfermedad periodontal. Fumar altera la microflora presente en la cavidad oral y cambia la respuesta inmune, lo que conduce a la destrucción de los tejidos de apoyo alrededor de los dientes. El tabaquismo no sólo contribuye a la aparición de la enfermedad periodontal, sino que también se ha demostrado que reduce las posibilidades de resultados exitosos en los tratamientos bucales.

- La predisposición genética es también una de las principales causas de la enfermedad periodontal. Se ha dicho que más del 10% de la población presenta enfermedades inflamatorias crónicas (como enfermedades autoinmunes, alergias, deficiencias inmunitarias o trastornos psiquiátricos). Estas predisposiciones cambian los mediadores inflamatorios del cuerpo en respuesta al desarrollo de la periodontitis. Además, también se han investigado moléculas inmunorreguladoras genéticas (quimioquinas, receptores de superficie de membrana y citoquinas por su presunto papel en la periodontitis y el papel que la genética tiene en predisponer a un individuo a la enfermedad y en efecto a los tratamientos periodontales colocando al paciente en una posición más susceptible. [5]

- El estrés es otro factor de riesgo para la enfermedad periodontal. El estrés es un problema creciente en la sociedad moderna y, por lo tanto, no es un factor de riesgo que se debe pasar por alto. El estrés no sólo induce la aparición de la enfermedad periodontal, sino que también reduce la respuesta inmune del cuerpo

para combatir la inflamación, así como reduce el resultado del tratamiento para la enfermedad periodontal. [6]

- Los medicamentos son otro factor de riesgo. Una persona que toma medicamentos tales como; antidepresivos y anticonceptivos orales, por nombrar algunos, pueden ser más propensos a la enfermedad periodontal. Muchos de los medicamentos que causan periodontitis amortiguan la vía inflamatoria implicada en el desarrollo la enfermedad periodontal o comprometiendo el manejo dental de estos pacientes. [7]

- El estilo de vida, como por ejemplo la nutrición inadecuada, el sedentarismo y la obesidad, también están relacionadas con la enfermedad periodontal. Existe una correlación comprobada entre la obesidad y la enfermedad periodontal, aunque no se conoce el mecanismo fisiopatológico exacto. Se cree que el aumento de la ingesta de carbohidratos ultraprocesados y alimentos azucarados conduce a una destrucción más rápida de los tejidos orales, así como la falta de atención primaria de salud general y el descuido de la higiene oral. [8]

- Por último, las enfermedades sistémicas también pueden considerarse como factores de riesgo potenciales para la enfermedad periodontal. A menudo, en estos casos, no está claro cuál fue el primero, la enfermedad sistémica o la enfermedad periodontal. [8]

- Algunas de las enfermedades sistémicas más comunes que pueden estar relacionadas con la enfermedad periodontal incluyen; enfermedad cardiovascular aterosclerótica, diabetes, embarazo, enfermedad respiratoria, enfermedad renal crónica, artritis reumatoide, deterioro cognitivo, cáncer y como se mencionó anteriormente, obesidad. Los dentistas deben ser conscientes de la relación potencial entre estas enfermedades y la enfermedad periodontal y saber cómo controlar adecuadamente a los pacientes para dar tratamiento y mantenimiento cuando sea necesario para limitar la gravedad de la destrucción periodontal. [9]

1.1.2 Análisis crítico de las diferentes clasificaciones periodontales empleadas hasta la actualidad.

- Ha habido muchos cambios en la clasificación oficial de la enfermedad periodontal. Con cambios importantes que ocurrieron en 1977, 1986, 1989, 1999 y 2018

  La clasificación de 1989 todavía carecía de información importante.

  - No había una categoría separada para clasificar la enfermedad estrictamente relacionada con la enfermedad gingival y periodontal
  - También hubo superposición entre grupos separados
  - Hubo dificultad para colocar a los pacientes en grupos definidos, con algunos pacientes que parecen ser capaces de ser clasificados en múltiples grupos
  - Diferencias relacionadas con la respuesta microbiológica y del huésped en aparentes trastornos diferentes
  - El énfasis en la edad de aparición de la enfermedad periodontal se volvió demasiado importante, en lugar de la gravedad de la enfermedad periodontal de los pacientes

- En general, hubo una falta de claridad en esta clasificación lo cual la llevó a la confusión clínica. [10]

1.1.3 PRINCIPALES ADICIONES A LA CLASIFICACIÓN DE 1999.

La adición de un componente por separado para representar enfermedades gingivales. Esta categoría se refiere a la enfermedad de la gingiva que aún no se ha extendido al periodonto ni a las estructuras que rodean los dientes. Este grupo se clasifica en la enfermedad gingival inducida por placa. La enfermedad gingival inducida por la placa está relacionada con la falta de higiene bucal o áreas retentivas en los dientes que no permiten el desbridamiento completo o eliminación de la placa de forma mecánica. La enfermedad gingival no relacionada con la placa puede estar relacionada con una serie de factores, incluyendo; enfermedades sistémicas como diabetes y leucemia, cambios hormonales como embarazo o pubertad, ingesta de medicamentos como ciclosporina y nifedipino, o la desnutrición. [10]

En segundo lugar, la sustitución de la Periodontitis adulta clasificada en 1989, por la Periodontitis Crónica en 1999. El modelo más antiguo de clasificación del grado de destrucción periodontal basado en la edad de los pacientes se ha vuelto arbitrario, ya que, en los últimos tiempos, los dentistas han podido ver patrones similares de pérdida ósea en adolescentes y, en algunos casos, niños dentro de la dentición primaria. Además, pueden surgir problemas dependiendo del tiempo de progresión de la enfermedad periodontal que el paciente se presente al dentista, ya que este momento de presentación no da una indicación clara de cuándo comenzó la aparición de la enfermedad. La periodontitis adulta se concluyó como engañosa, ya que no

había hallazgos histopatológicos únicos ni punto de determinación natural en cuanto a cuándo es realmente probable que ocurra la enfermedad, sin embargo, la periodontitis crónica se conoce comúnmente como el significado de la progresión de la enfermedad con el tiempo en ausencia de tratamiento. Finalmente, se sabe que la periodontitis crónica ocurre principalmente en adultos, pero ahora se sabe que también puede estar presente en personas más jóvenes. La tasa de enfermedad periodontal es lenta y continua en el tiempo normalmente proporcional a la cantidad de placa presente, sin embargo, hay factores locales que pueden acelerar la tasa de destrucción periodontal, incluyendo; zonas retentivas de placa, cálculo subgingival, enfermedades sistémicas y factores extrínsecos como el tabaquismo. [10]

En tercer lugar, la eliminación de la periodontitis refractaria. Este término se refiere a los pacientes que, a pesar de que mantienen una higiene bucal adecuada para eliminar la placa y han tenido el tratamiento periodontal adecuado, prevalece la enfermedad periodontal y se puede observar la pérdida continua de soporte. Hay muchos factores que pueden interferir con la eficiencia del tratamiento periodontal, incluyendo, pero no limitando a; el tipo de tratamiento periodontal proporcionado ya sea quirúrgico o no quirúrgico, tipo de diente, afectación de furcación, tipo y cepas de bacterias presentes en la microflora del paciente y hábitos como el de fumar. El término periodontitis recurrente se decidió que era un término más apropiado que indicaba el retorno de la periodontitis en lugar de una enfermedad separada. [10]

Cuarto, vino el reemplazo de periodontitis de inicio temprano por periodontitis agresiva. Anteriormente, en la clasificación de 1989, se acuñó la periodontitis de inicio temprano para los pacientes menores de 35 años que presentan la enfermedad

periodontal sin la presencia o muy poca presencia de factores locales. Se encontró que la periodontitis de inicio temprano era demasiado restrictiva y el término periodontitis agresiva era más apropiado. El diagnóstico de periodontitis agresiva se puede utilizar para pacientes que presentan un mayor grado de destrucción periodontal en comparación con los factores locales, como niveles elevados de *Actinobacillus actinomycetemcomitans o Porphyromonas gingivalis,* anomalías en la producción de fagocitos, prostaglandina E2 e interleucina 1B. [10]

En quinto lugar, la clasificación de la enfermedad periodontal como manifestación de la enfermedad sistémica en 1999 se elaboró más detalladamente en la versión de 1989. Hay muchas enfermedades hematológicas que van de la mano con la enfermedad periodontal, como la neutropenia adquirida y la leucemia por nombrar sólo dos. Además, hay muchos trastornos genéticos como el síndrome de Down y el síndrome de Cohen que pueden causar periodontitis como efecto secundario. Esta es la clasificación que tiene más alcance y es más probable que se agregue en el futuro.

A continuación, se creó la actualización de *Periodontitis Ulcerativa Necrotizante* (1989), a *Enfermedad Periodontal necrotizante (*1999) para permitir la subdivisión de gingivitis ulcerosa necrotizante y periodontitis ulcerativa necrotizante, ambas generalmente relacionadas con una menor resistencia sistémica a la infección bacteriana. La diferencia entre la gingivitis ulcerosa necrotizante y la periodontitis ulcerativa necrotizante radica en que la primera se limita a los tejidos gingivales y la segunda ya alcanza una extensión más hacia la unión periodontal. [10]

La versión de 1999 vió la adición de absceso periodontal y lesiones periodónticas-endodónticas sin que se realizaran cambios en la definición de la clasificación.

Finalmente, defectos del desarrollo o deformidades y condiciones adquiridas se añadió en 1999 para incluir factores locales relacionados con los dientes y las restauraciones, deformidades mucogingivales alrededor de los dientes y en las crestas edéntulas.

Desde 1999, a partir de los estudios científicos realizados a la población, en los cuales la evidencia pudo evaluarse y desarrollar así un nuevo marco de la clasificación.
En primer lugar, la salud periodontal, la gingivitis y las afecciones gingivales. Se destacaron problemas anteriores, como la inflamación gingival en un solo sitio o más de uno y la definición de gingivitis, también se confirmó que el sangrado en el sondeo debería ser el parámetro principal para establecer umbrales para la gingivitis, y respaldado con la información obtenida a partir de la profundidad de sondaje en la bolsa periodontal. Esta nueva clasificación propuso un nuevo enfoque y ratificó la importancia del mantenimiento y la vigilancia de los pacientes tratados de periodontitis con éxito. También se acordó que un paciente limitado a la gingivitis puede volver a un estado saludable, sin embargo, un paciente periodontal sigue siendo un paciente periodontal durante el resto de su vida y requiere apoyo, mantenimiento y tratamiento posterior. La clasificación en su totalidad se puede ver a continuación. [11]

- Salud periodontal, enfermedad gingival y afecciones
- Salud periodontal y salud gingival
    - Salud gingival clínica en un periodonto intacto
    - Salud gingival clínica en un periodonto reducido

        - Paciente de periodontitis estable
        - Paciente sin periodontitis
    - Gingivitis – inducida por placa
        - Asociado con biofilm dental solo
        - Mediado por factores de riesgo sistémicos o locales
        - Agrandamiento gingival inducido por drogas
    - Enfermedades gingivales - no inducidas por placa
        - Trastornos genéticos/de desarrollo
            - Infecciones específicas
            - Condiciones inflamatorias e inmunitarias
            - Procesos reactivos
            - Neoplasias
            - Enfermedades endocrinas, nutricionales y metabólicas
            - Lesiones traumáticas
            - Pigmentación gingival

En segundo lugar, se acordó una nueva clasificación de periodontitis. A partir de la clasificación de 1989, se sabía que la periodontitis tenía varias presentaciones clínicas diferentes, diferentes edades de inicio y tasas de progresión. Desde 1999, más información ha permitido a los profesionales desarrollar una nueva clasificación. En 2018, la periodontitis fue identificada como; Periodontitis *necrotizante, periodontitis como manifestación de enfermedad sistémica y periodontitis* (la periodontitis crónica y agresiva previamente conocida se agruparon para convertirse en solo periodontitis). Se acordó que la periodontitis era demasiado amplia, por lo que se clasificó más a fondo sobre la base de un sistema de ensayo y clasificación multidimensional que

tiene espacio para adaptarse a medida que surgen nuevas pruebas a lo largo del tiempo. [11]

Esta clasificación por estadios y grados depende de la gravedad de la enfermedad que se presenta y de la complejidad del tratamiento. La calificación proporciona información suplementaria sobre las características biológicas de la enfermedad (análisis basado en la historia de la tasa de evolución de la enfermedad, evaluación del riesgo de progresión adicional, mal resultado anticipado del tratamiento y evaluación del riesgo de que la enfermedad o su tratamiento pueda afectar la salud general del paciente).

La puesta en escena implica 4 estadios (I, II, III, IV) y tres grados (A, B y C) y se determina después de evaluar algunas variables, tales como:

- Pérdida de inserción clínica.
- Cantidad y porcentaje de la pérdida ósea.
- Profundidad de sondaje.
- Presencia y extensión de defectos óseos angulares y afectación de furca.
- Movilidad dental y pérdida de dientes debido a periodontitis.

La calificación por grados incluye tres niveles (Grado A – bajo riesgo, Grado B – riesgo moderado, Grado C – alto riesgo de progresión). La calificación permite al médico añadir factores adicionales al diagnóstico que son cruciales para el manejo integral del paciente. [11] Abarca y está relacionado con:

- Progresión de la periodontitis
- Estado de salud general

- Otras exposiciones como el tabaquismo o el nivel de control metabólico en la diabetes.

Las subclases de Periodontitis se pueden ver a continuación;

- Enfermedad periodontal necrosante
    - Gingivitis necrosante.
    - Periodontitis necrotizante.
    - Estomatitis necrotizante.
- Periodontitis como manifestación de enfermedad sistémica

La clasificación aquí debe basarse en la enfermedad sistémica primaria siguiendo los códigos de la clasificación internacional y estadística de enfermedades y problemas relacionados con la salud.

- Periodontitis
    - Etapas – basadas en la gravedad de la enfermedad.
        - Etapa I – periodontitis inicial
        - Etapa II – periodontitis moderada
        - Etapa III – periodontitis grave con potencial de pérdida adicional de dientes
        - Etapa IV – periodontitis grave con potencial de pérdida de la dentición
    - Extensión y distribución
        - Localizada
        - Generalizada
        - Distribución molar-incisiva
    - Grados – evidencia o riesgo de progresión rápida, respuesta anticipada a los tratamientos

- Grado A – tasa lenta de progresión
- Grado B – Tasa moderada de progresión
- Grado C – tasa rápida de progresión

En tercer lugar, las enfermedades sistémicas asociadas con la pérdida de tejido de soporte periodontal. Esta clasificación permitió el reconocimiento de trastornos sistémicos raros que generalmente resultan en la presentación temprana de periodontitis grave. Algunas afecciones (como el síndrome de Papillon Lefevre), generalmente resultan en la presentación temprana de periodontitis severa. Estas condiciones se agrupan con el nombre de *Periodontitis como una manifestación de la Enfermedad Sistémica,* y la clasificación debe basarse en la enfermedad sistémica primaria. Otras condiciones sistémicas (enfermedades neoplásicas), que pueden afectar al aparato periodontal independientemente de la periodontitis inducida por biopelícula de placa dental, deben agruparse como enfermedades *o condiciones sistémicas que afectan a los tejidos de soporte periodontal.* Existen otras afecciones sistémicas (como la diabetes mellitus no controlada), que pueden modificar el curso de la periodontitis, estas condiciones parecen formar parte de la naturaleza multifactorial de enfermedades complejas como la periodontitis, y se incluyen en la nueva clasificación de la periodontitis. La clasificación elaborada a partir de las manifestaciones periodontales de las enfermedades sistémicas y las condiciones de desarrollo y adquiridas se puede ver a continuación [11]

- Enfermedades o afecciones sistémicas que afectan los tejidos de apoyo periodontal
- Otras condiciones periodontales
    - Abscesos periodontales

    - Lesiones endodonto-periodontales
- Deformidades mucogingivales y condiciones alrededor de los dientes:
    - Fenotipo gingival
    - Recesión gingival/tejido blando
    - Falta de gíngiva
    - Disminución de la profundidad vestibular
    - Posición muscular/frenum aberrante
    - Exceso de gíngiva
    - Color anormal
    - Condición de la superficie radicular expuesta
- Fuerzas oclusales traumáticas: (reemplazó el término fuerza oclusal excesiva)
    - Trauma oclusal primario
    - Trauma oclusal secundario
    - Fuerzas de ortodoncia
- Prótesis y factores relacionados con los dientes que modifican o predisponen a las enfermedades/periodontitis gingival inducidas por la placa:
    - Factores localizados relacionados con los dientes
    - Factores localizados relacionados con la prótesis dental

La clasificación 2018 de la enfermedad periodontal también incluyó una nueva clasificación para enfermedades y condiciones periimplante.

La salud periimplantaria se definió clínica e histológicamente como una ausencia de signos visuales de inflamación y sangrado en el sondeo. Puede existir alrededor de un implante con soporte óseo normal o disminuido. La mucositis periimplante se

define como sangrado en el sondeo y signos visuales de inflamación, más comúnmente causados por la placa. Esto se puede revertir con medidas destinadas a eliminar la placa. [11]

La periimplantitis se define como una condición patológica asociada a la placa que ocurre en los tejidos orales que rodean un implante dental. Se caracteriza por la inflamación en la mucosa periimplante que puede conducir a la posterior pérdida de hueso de soporte. Se cree que la mucositis periimplante precede a la periimplantitis. El inicio puede ocurrir temprano después de la colocación del implante y se puede observar radiográficamente si se sospecha, la causa de esta inflamación normalmente está relacionada con la placa. En ausencia de tratamiento, la progresión continúa en un patrón no lineal y acelerado. [11]

Las deficiencias de tejidos duros y blandos se pueden observar después de la pérdida de dientes, sobre todo en forma de crestas alveolares disminuidas. Las deficiencias más grandes de los tejidos duros y blandos se pueden observar en otros sitios relacionados con la pérdida grave de soporte periodontal, trauma de extracción, infección endodóntica, fracturas de raíces, placas óseas bucales delgadas y mala posición dental. Esta pérdida de tejido duro y blando puede estar asociada con enfermedades sistémicas o medicamentos que se toman que pueden afectar la cantidad de hueso formado naturalmente, la agenesia dental y la presión de la prótesis. [11]

Con las modificaciones establecidas en la última clasificación de enfermedades periodontales la Federación Europea de Periodoncia (EFP, por su sigla en ingles)

propuso establecer un protocolo, en los cuales, los clínicos se puedan enfocar para concretar un diagnóstico, y así, de esa forma, estandarizar los planes de tratamiento. [12]

Las patologías periodontales agudas como lo son los abscesos periodontales y las enfermedades periodontales necrosantes son condiciones clínicas de instauración rápida que involucran al periodonto y/o estructuras adyacentes y se manifiestan generalmente con dolor, molestias, destrucción de tejidos e infección. Dentro de esta clasificación se encuentra el absceso gingival, el absceso periodontal, las enfermedades periodontales necrosantes, la gingivoestomatitis herpética, el absceso pericoronal, la pericoronaritis y las lesiones endo-periodontales. [11]

Este tipo de lesiones generalmente hacen que el paciente busque ayuda profesional de forma rápida debido al dolor agudo que generan y lo que junto con la rápida destrucción de tejidos periodontales confieren una mayor importancia al diagnóstico y tratamiento temprano.

El absceso periodontal puede ser descrito específicamente como una infección purulenta localizada limitada a un periodo de tiempo con una sintomatología clínica fácilmente detectable. La ocurrencia de este se debe a una causa multifactorial por lo que se clasifica de acuerdo con la fuente de infección, dentro de las que podemos encontrar la necrosis pulpar, causante de los abscesos endodónticos, periapicales y dentoalveolares, las infecciones periodontales las cuales causan el absceso gingival o periodontal, traumatismos en el periodonto y la impactación de cuerpos extraños. [2]

El desarrollo de un absceso periodontal comienza con la invasión bacteriana de los tejidos blandos que rodean la bolsa periodontal, lo cual se convertirá en un proceso inflamatorio a través de la liberación de factores quimiotácticos por bacterias que atraen polimorfonucleares (PMN), leucocitos y otras células. Esto activará la liberación intensa de citosinas, lo que conducirá a la destrucción de los tejidos conectivos; encapsulación de la infección bacteriana y consiguiente la producción de pus. Una vez formado el absceso, la tasa de destrucción dentro del mismo dependerá del crecimiento de bacterias dentro de los focos; su virulencia y el pH local. [12]

Los abscesos periodontales pueden ocurrir tanto en pacientes diagnosticados con periodontitis como en pacientes sanos, en pacientes con periodontitis, la presencia de una absceso periodontal puede representar una exacerbación de la enfermedad, favorecida por la existencia de bolsas periodontales tortuosas, lesiones de furca o defectos verticales en los cuales una obstrucción marginal de la bolsa podría resultar en una extensión de la infección en sus alrededores, además cambios en la composición de la microbiota subgingival, con un aumento de la virulencia bacteriana o una disminución de las defensas del huésped disminuyen la capacidad para drenar el aumento de la supuración desde dentro de la bolsa. [13]

En el caso de la ocurrencia de estas lesiones en pacientes sanos, podemos pensar en agentes causales tale como la impactación de cuerpos extraños (hilo dental, elástico de ortodoncia, palillo de dientes, dique de goma o alimentos como las palomitas de maíz), hábitos nocivos (morderse las uñas) los cuales pueden favorecer la formación de abscesos debido a la impactación subgingival de estos elementos. Evidencias muestran que factores de ortodoncia, tales como las fuerzas ortodóncicas

inadecuadas o una mordida cruzada, favorecen el desarrollo de los abscesos periodontales , alteraciones anatómicas severas tales como diente invaginado, densevaginatus (surcos) u odontodisplasia, alteraciones anatómicas menores, como desgarros de cemento, perlas de esmalte o surcos de desarrollo, condiciones iatrogénicas, como perforaciones, daño grave de la raíz: fractura vertical de la raíz o síndrome del diente fracturado que se extiende a través de la raíz. reabsorción de raíz externa se caracterizan por ser procesos inflamatorios, purulentos y localizados en los tejidos periodontales que desencadenan dolor y según sea la etiología de la infección puede presentar diferentes síntomas, esta patología tiene una prevalencia del 8 al 14% dentro de todas las afecciones dentales que requieren tratamiento de urgencia. (13)

El tratamiento de estas lesiones se suele separar en dos fases, la primera fase estará enfocada al tratamiento de la lesión aguda para así detener la destrucción de tejidos y controlar los síntomas, los cuales serán la causa de urgencia por la que el paciente acude a la clínica, la segunda fase será el tratamiento causal y/o el tratamiento de la lesión residual, el cual se llevará a cabo una vez resuelta la situación de urgencia. Para el tratamiento de la lesión aguda se han propuesto diferentes alternativas como lo son: incisión y drenaje, raspado y alisado radicular de bolsas profundas causales, cirugía periodontal y administración local o sistémica de antibióticos. (14)

Las enfermedades periodontales necrosantes son un grupo de enfermedades infecciosas que incluyen la gingivitis ulcerosa necrosante, la periodontitis ulcerosa necrosante y la estomatitis necrosante. Sin embargo, se ha propuesto que estas condiciones puedan representar diferentes estadios de la misma enfermedad por

tener etiologías, características clínicas y tratamientos similares, aunque varían en dependencia de cuán avanzada esté la enfermedad. [15]

Estas enfermedades comparten características clínicas comunes que consisten en un proceso inflamatorio agudo y la presencia de destrucción periodontal, Estas enfermedades se encuentran entre las afecciones inflamatorias más graves asociadas con las bacterias del Biofilm oral. Por tanto, es importante controlar los factores de riesgo y, una vez instaurada la enfermedad, actuar con rapidez para limitar su progresión. [15]

El tratamiento de estas condiciones debe organizarse en etapas sucesivas: tratamiento de la fase aguda; tratamiento de la condición preexistente y tratamiento correctivo de las secuelas de la enfermedad; fase de apoyo o mantenimiento. [16]

El tratamiento de la fase aguda tiene dos objetivos principales: detener el progreso de la enfermedad y la destrucción de tejidos; y controlar la sensación general de malestar y dolor del paciente que interfiere con las prácticas de nutrición e higiene bucal [15] . Las enfermedades periodontales necrotizantes ocurren normalmente después de una infección crónica por gingivitis o periodontitis preexistente. Una vez controlada la fase aguda, se debe iniciar el tratamiento de la condición crónica preexistente. En esta etapa, y también durante la fase aguda, se debe prestar atención al control de los factores predisponentes sistémicos, incluido el tabaquismo, el sueño adecuado, la reducción del estrés y el control de las patologías sistémicas presentes en el paciente. [17]

La corrección de las secuelas de la enfermedad debe tener en cuenta la rectificación de la topografía gingival alterada provocada por la enfermedad ya que los cráteres gingivales pueden favorecer la acumulación de placa y la recurrencia de la patología. La fase de apoyo o mantenimiento tiene como objetivo principal el cumplimiento de las prácticas de higiene bucal y el control de los factores predisponentes.

Al establecer un diagnóstico diferencial con las patologías anteriores, seguiremos la secuencia clínica recomendada por la EFP para determinar casos sospechosos de periodontitis, entre sus pasos secuenciales encontramos: confirmación del diagnóstico de periodontitis, clasificación del caso de periodontitis según estadios y clasificación del caso según grados. (18)

La periodontitis se define como una enfermedad inflamatoria crónica multifactorial asociada a la placa bacteriana y caracterizada por la destrucción progresiva del aparato de sostén del diente. La enfermedad de la periodontitis se caracteriza por tres factores: la pérdida de los tejidos de sostén periodontales y la pérdida de hueso alveolar, la presencia de bolsas periodontales y sangrado gingival. (19)

Una vez establecido el diagnóstico positivo a periodontitis seguiremos la secuencia de tratamiento propuesto por el grupo de trabajo para la clasificación de enfermedades periodontales y perimplantarias en el 2017, este protocolo establece un tratamiento de enfoque gradual preestablecido que, dependiendo del estadio de la enfermedad, debe ser incremental, incluyendo en cada paso diferentes intervenciones. (12)

La secuencia de tratamiento para la periodontitis incluye 4 fases que será aplicada de forma individualizada de acorde a las características de cada paciente en cuanto al estadio en que se encuentra la enfermedad y a los factores de riesgos presentes en el mismo. [12]

La primera fase del tratamiento tiene como finalidad inducir un cambio de comportamiento, motivando al paciente a emprender con éxito la eliminación del biofilm dental supragingival y el control de los factores de riesgo, y puede incluir entre sus intervenciones: el control del biofilm dental supragingival, intervenciones para mejorar la eficacia de la higiene oral, eliminación mecánica profesional de placa, control de los factores de riesgo (abandono del tabaquismo, mejora del control metabólico de la diabetes y, tal vez, ejercicio físico, asesoramiento dietético y pérdida de peso). Este primer paso del tratamiento debe aplicarse a todos los pacientes con periodontitis, independientemente del estadio en que se encuentre su enfermedad, y debe reevaluarse con la frecuencia. [12]

La segunda fase del tratamiento tiene un enfoque dirigido a la causa y tiene como finalidad reducir y/o eliminar el biofilm subgingival y el cálculo. Además de la propia instrumentación subgingival, esta fase puede incluir entre sus intervenciones: el uso de agentes físicos o químicos coadyuvantes, uso de antimicrobianos subgingivales de administración local y uso de antimicrobianos sistémicos. Esta segunda fase del tratamiento debe ser llevada a cabo en todos los pacientes con periodontitis, independientemente del estadio de la enfermedad, y solo en dientes con pérdida de soporte periodontal y/o formación de bolsas periodontales, en determinadas situaciones clínicas, como, por ejemplo, en presencia de formas agresivas de la

enfermedad, la primera y segunda fase del tratamiento podrían aplicarse simultáneamente, para prevenir posibles complicaciones. [12]

El uso de agentes físicos, como el láser se ha venido estudiando en los últimos 20 años con mayor profundidad, durante este período se han utilizado diferentes tipos de láseres en el tratamiento de la periodontitis, según el material activado de forma ótica, los dispositivos se diferencian en láser en estado sólido (Nd: YAG, Nd: YAP) y láser en estado liquido y gaseoso ($C0_2$, Argón, Elio-Neón). En el campo de la terapia periodontal no quirúrgica, el láser Nd:YAG (Neodymium, Yttium-Alluminum-Garnet) ha sido el más estudiado, por ser este uno de los que más beneficios aporta al tratamiento. [10]

La respuesta individual a la segunda fase debe ser evaluada una vez hayan curado los tejidos periodontales (reevaluación periodontal). De no alcanzarse los objetivos finales del tratamiento debe valorarse pasar al paciente hacia la tercera fase, en caso contrario, si el tratamiento ha obtenido los resultados deseados los pacientes deben ser ingresados en un programa de mantenimiento periodontal.

La tercera fase de la terapia tiene como blanco tratar las zonas de la dentición que no hayan respondido adecuadamente a la segunda fase del tratamiento, dígase bolsas residuales mayores de 4 mm con sangrado al sondaje o presencia de bolsas periodontales profundas (≥6 mm).[12] El propósito de esta fase es acceder a los sitios con bolsas profundas, con el objetivo de regenerar o resecar esas lesiones, que agregan complejidad en el manejo de la periodontitis (defectos verticales y de furca), esta fase puede incluir las siguientes intervenciones: instrumentación subgingival

repetida con o sin terapias complementarias, cirugía periodontal con colgajo de acceso, cirugía periodontal resectiva y cirugía periodontal regenerativa. El tratamiento quirúrgico de la enfermedad periodontal cumple esencialmente dos propósitos: por un lado, crea la accesibilidad para el correcto desbridamiento profesional de las superficies radiculares desbridadas; por otro, establece una morfología gingival que facilita el autocontrol de placa y mejora la preservación de sus dientes a largo plazo. [43]

El tratamiento periodontal quirúrgico no solo está indicado en situaciones de eliminación de bolsas periodontales profundas, tras tratamiento periodontal no quirúrgico y reevaluación, también puede indicarse en el tratamiento de defectos óseos de forma, para así, restablecer el contorno óseo fisiológico del hueso alveolar; o en problemas mucogingivales, bien sea por razones de tipo estético o cosmético o por hipersensibilidad, recesiones de la encía marginal o caries de cuello (lesiones de abrasión o atrición). Otras indicaciones incluyen el desbridamiento de abscesos periodontales agudos. Un pilar importante para garantizar el éxito de estos tratamientos es someter al paciente a un proceso de selección estricto, descartando todo aquel paciente que presente alguna contraindicación de los mismos, las contraindicaciones de los tratamientos periodontales quirúrgicos son: paciente con mal control de placa y no cooperante, paciente fumador, paciente trasplantado y/o inmunodeprimido, paciente con trastornos hemáticos, paciente con trastornos endocrinos o paciente con enfermedad cardiovascular de riesgo. La tendencia a la recidiva, problemas de tipo estético, la posibilidad de aumentar la tendencia a la caries y la sensibilidad dentaria son algunos de los inconvenientes del tratamiento periodontal quirúrgico. [43]

Los procedimientos quirúrgicos conservadores se han definido como aquellos cuyo objetivo es acceder a las superficies radiculares afectadas sin eliminar cantidades significativas de tejidos duros y/o blandos. Dentro de estos procedimientos se encuentra la gingivectomía, la indicación más notoria para una gingivectomía es la presencia de bolsas supraalveolares profundas, la misma no se considera conveniente cuando la incisión lleva a la resección de toda la zona gingival, esta técnica presenta como limitaciones no poder utilizarse para el tratamiento de lesiones infraóseas o cráteres óseos. Los procedimientos con colgajo son otra alternativa, donde un colgajo es la parte de encía y/o mucosa separada quirúrgicamente de los tejidos subyacentes para conseguir visibilidad/acceso al hueso y a superficies radiculares, permitiendo además colocarlo en una situación diferente cuando hay problemas mucogingivales. Las ventajas de estas cirugías incluyen: la conservación de la encía existente, exposición del hueso marginal, gracias a lo cual es posible identificar la morfología de los defectos del hueso, exposición de furca, en comparación con la gingivectomía y que el período postoperatorio generalmente causa menos molestias al paciente. Dentro de los tipos de colgajos periodontales se encuentran: colgajo abierto con incisiones intrasurculares, colgajos con incisiones paramarginales como el colgajo de Widman modificado y colgajos de preservación de papila. [13;19]

En casos donde persistan bolsas profundas (residuales) y/o defectos verticales ≥ 6 mm con defectos de furca clase II o III y además el paciente esté diagnosticado con periodontitis en estadio III, después de un segundo paso adecuado del tratamiento periodontal, esta indicado realizar cirugía periodontal resectiva, la cual va a cambiar

la arquitectura de los tejidos duros y / o blandos para lograr profundidades de sondaje poco profundas, tomando en consideración el posible aumento de las recesiones gingivales. [47]

Los defectos intraóseos (también llamados defectos “verticales”) son una secuela anatómica de la progresión de la enfermedad periodontal, estos defectos están asociados con un mayor riesgo de progresión de la enfermedad y, como tales, a menudo se considera que requieren una intervención quirúrgica más allá de la terapia periodontal relacionada con la causa. [49]

En las décadas de 1970 y 1980, estudios pioneros han demostrado que los defectos intraóseos tienen potencial de curación a través de la regeneración utilizando membranas de barrera, incluida la formación de una nueva unión epitelial y de hueso lo cual es medible clínica, radiográfica e histológicamente. Entre los diversos materiales empleados en la actualidad, existe evidencia de una verdadera regeneración periodontal para aloinjerto óseo liofilizado descalcificado, mineral óseo bovino desmineralizado y derivado de la matriz del esmalte. Por el contrario, el vidrio bioactivo, la hidroxiapatita y el fosfato tricálcico aunque son eficientes para mejorar la clínica, histológicamente han mostrado evidencia limitada de regeneración. Además, se demostró el efecto regenerativo para los factores derivados de las plaquetas, aunque todavía no se dispone de evidencia histológica de la regeneración periodontal para el plasma rico en plaquetas autógeno y la fibrina rica en plaquetas. [49]

Después de haber realizado la terapia correspondiente a la tercera fase se debe proceder a una evaluación de la respuesta individual a esta fase del tratamiento. De manera idónea, una ves en este punto se deberían haber alcanzado los objetivos finales del tratamiento, incorporando a los pacientes en un programa de mantenimiento periodontal. [12]

El mantenimiento periodontal o fase 4 del tratamiento tiene por finalidad mantener la estabilidad periodontal en todos los pacientes con patología periodontal tratada, utilizando indistintamente acciones preventivas y terapéuticas empleadas en la primera y segunda fase del tratamiento, en base al estado gingival y periodontal de la dentición del paciente. Esta fase debe ser ejecutada a intervalos regulares, según las necesidades del paciente, si se detectara una recidiva de la patología, se debe volver a establecer un diagnóstico y un plan de tratamiento. El cumplimiento de los regímenes de higiene oral recomendados y los estilos de vida saludables forman parte del mantenimiento periodontal. [20]

2. OBJETIVOS

2.1.1. Objetivo principal:

- Conocer las opciones terapéuticas con que cuentan las diferentes fases del tratamiento de la periodontitis.

2.1.2. Objetivos secundarios:

- Diferenciar en cuanto a su eficacia la instrumentación no quirúrgica subgingival realizada con instrumentos sónicos / ultrasónicos en comparación con la instrumentación subgingival realizada con instrumentos manuales.
- Comparar los tratamientos más utilizados en la fase de mantenimiento periodontal.

3. MÉTODOS Y MATERIALES

3.1.1. CRITERIO DE BÚSQUEDA

Fuentes de información:

Para la elaboración del presente trabajo se realizó una revisión bibliográfica a través de las bases de datos Pubmed, Medline, ScienceDirect, Web of Science, Academic Search Ultimate, EBSCO; El uso de las bibliotecas y sus contenidos (libros y revistas científicas); más específicamente el contenido de las bibliotecas de la Universidad Europea de Madrid y la Universidad Alfonso X de Madrid , Asegurando como principio de inclusión que las fuentes a las que e refiero sean científicamente fiables y no sesgadas de ninguna manera para eso se seleccionó:

- Fuentes científicas relacionadas únicamente con mi tema ¨enfermedad periodontal¨, tratamientos y pautas en el mantenimiento periodontal.
- Fuentes publicadas en los últimos 15 años (2004-presente). Esta escala temporal me permitirá investigar la información más contemporánea y tópica, lo que me permitirá comparar artículos antiguos (2004) con investigaciones más contemporáneas (presente).
- Estudios donde incluya un mínimo de 100 personas. La razón de esto es que cualquier estudio de por debajo de 100 personas es más susceptible a resultados sesgados o anomalías que podrían afectar los hallazgos generales. Por lo tanto, al tener una muestra mínima de 100 personas, tengo la intención de evitar este problema.

3.1.2. Principios de exclusión:

- Cualquier fuente publicada en fuentes no fiables. Por ejemplo, Wikipedia o cualquier otro sitio web/revista en línea que carezca de fiabilidad científica.
- Quedan excluidas todas las fuentes que no se relacionen directamente con el tema ¨enfermedad periodontal¨ y su tratamiento.
- Cualquier fuente publicada hace más de 15 años será excluida
- Las fuentes escritas en cualquier idioma excepto el inglés y español serán excluidas

Las palabras clave que se utilizan en la siguiente investigación incluyen lo siguiente; *Enfermedad periodontal,* enfermedad *gingival,* clasificación*, periodontitis, periimplantitis, mantenimiento periodontal, cirugía periodontal, tratamiento periodontal no invasivo,*

4. DISCUSIÓN:

La finalidad del tratamiento periodontal en general es preservar, mejorar y mantener la dentición natural del paciente, entre sus alternativas se incluyen un grupo terapias denominadas como no quirúrgicas donde se ubican acciones como: la motivación al paciente, las instrucciones de higiene oral y la instrumentación subgingival, este último, se puede realizar con instrumentos manuales (curetas) o eléctricos (dispositivos sónicos/ultrasónicos) diseñados específicamente para acceder a las superficies radiculares en la región subgingival y eliminar el biofilm y el cálculo subgingival, estos procedimientos son recogidos en la primera y segunda etapa del tratamiento para la periodontitis, el objetivo de la instrumentación subgingival es reducir la inflamación de los tejidos blandos mediante la eliminación de los depósitos duros, eliminación de cemento contaminado y la reducción del número de microorganismos. El propósito final será el cierre de la bolsa, definido por una profundidad de sondaje ≤ 4 mm y ausencia de sangrado. (21)

Las fases del tratamiento de la periodontitis serán aplicadas de forma individual de acorde a las características de cada paciente en cuanto al estadio en que se encuentra la enfermedad y a los factores de riesgos presentes en el mismo. (19)

4.1 Primera fase del Tratamiento de la Periodontitis

La primera fase del tratamiento tiene como objetivo guiar al paciente a un cambio de comportamiento, motivándolo para que realice la eliminación correcta del biofilm dental supragingival y un control estricto de factores de riesgo. La evidencia científica actual nos dice que se deben proporcionar instrucciones de higiene bucal profesional para reducir la placa y la inflamación gingival, siendo este paso de suma importancia

para involucrar al paciente en su tratamiento periodontal. Se recomienda el cepillado de dientes manual o eléctrico como medio principal para reducir la placa y la gingivitis. Los beneficios del cepillado de dientes superan cualquier riesgo potencial, ante la presencia de inflamación gingival. La limpieza interdental, preferiblemente con cepillos interdentales debe enseñarse profesionalmente a los pacientes, además se pueden sugerir otros dispositivos / métodos de limpieza interdental cuando el uso de cepillos interdentales no sea apropiado. [30]

Un estudio reciente evaluó la eficacia del cepillado con cepillo eléctrico en comparación con un cepillo manual, la evidencia mostró que la eficacia de los cepillos eléctricos y manuales comparada mediante la evaluación de la placa dental presente antes y después del cepillado luego de un solo ejercicio de cepillado, mostraron que, en promedio, la eficacia de eliminación de placa para el cepillo manual fue del 42% y del 46% para los cepillos eléctricos, en este mismo estudio se evaluó la eficiencia de los cepillos eléctricos con baterías reemplazables con respecto a los eléctricos recargables donde se evidenció que los cepillos con baterías recargables producen una mayor reducción de placa dental que los diseños operados por baterías reemplazables, este estudio concluyó entonces que mostró que los cepillos con baterías recargables producen mayores reducciones en los puntajes de placa que los diseños operados por baterías reemplazables. [31]

Mantener una placa limitada o nula en el área interdental ayuda a asegurar la preservación de la salud buco-dental. El control de la placa interdental generalmente se logra con hilo dental o cepillado interdental. Según la evidencia disponible en la actualidad, el hilo dental, a pesar de ser ampliamente recomendado, no parece ser

particularmente eficaz para eliminar la placa interdental, una posible explicación de esto puede ser la dificultad de la técnica en sí, que puede limitar el cumplimiento del paciente, los cepillos interdentales se prefieren como la primera opción de limpieza interdental en pacientes con periodontitis, mientras que se debe sugerir el uso de hilo dental para sitios periodontalmente sanos, donde los cepillos interdentales no atraviesan el área interproximal sin causar trauma. [31]

En un estudio donde 7661 sujetos respondieron a un cuestionario sobre el uso del hilo dental, se encontró que las probabilidades de tener periodontitis fueron un 17% más bajas para alguien que usa hilo dental más de una vez a la semana en comparación con alguien que no lo usa. [33]

Las instrucciones de higiene bucal y la motivación del paciente en las prácticas de higiene bucal deben ser una parte integral del manejo del paciente durante todas las etapas del tratamiento periodontal. Se han propuesto diferentes intervenciones conductuales, así como métodos de comunicación y educativos, para mejorar y mantener el control de la placa del paciente a lo largo del tiempo [32].

La remoción del biofilm dental supragingival y los depósitos calcificados por parte de un profesional se considera un componente esencial en la prevención primaria y secundaria de la periodontitis, así como dentro del tratamiento básico de las enfermedades periodontales inducidas por placa dental [34,35].Un estudio con un seguimiento de 450 días en 25 sujetos, concluyó que la realización del desbridamiento supragingival llevado a cabo antes del desbridamiento subgingival, disminuyó las necesidades de tratamiento subgingival y mantuvo la estabilidad periodontal en el

tiempo [36]. Además, el desbridamiento supragingival puede inducir cambios beneficiosos en la microbiota subgingival [37]. Otro estudio estableció que los factores retentivos tales como la aparatología ortodóncica pueden incrementar el riesgo de empeoramiento de la condición periodontal. [38]

Las intervenciones para el control de los factores de riesgo han tenido como objetivo educar y asesorar a los pacientes para un cambio de comportamiento. Otros factores relevantes asociados con estilos de vida saludables (reducción del estrés, asesoramiento dietético, pérdida de peso o aumento de la actividad física) también pueden formar parte de la estrategia general para reducir los factores de riesgo del paciente. [39]

En una revisión sistemática, los autores identificaron 13 pautas relevantes en cuanto a intervenciones para dejar de fumar tabaco, promoción del control de la diabetes, ejercicio físico (actividad), cambio de dieta y pérdida de peso. Además, en esta misma revisión se encontraron 25 estudios clínicos que evalúan el impacto de estas intervenciones en pacientes con gingivitis / periodontitis. [39]

4.2 Segunda fase del Tratamiento de la Periodontitis.

La segunda fase del tratamiento (también conocida como tratamiento causal) tiene como objetivo la eliminación (reducción) del biofilm subgingival y el cálculo, lo cual tiende en la mayoría de los casos a estar asociado con la eliminación de la superficie radicular (cemento).

Este segundo paso de la terapia debe aplicarse a todos los pacientes con periodontitis, independientemente de la etapa de su enfermedad, y solo en dientes

con pérdida de soporte periodontal y / o formación de bolsas periodontales. En situaciones clínicas específicas, como en presencia de profundidades de sondaje muy profundas, tanto el primero y como el segundo paso de la terapia podrían administrarse simultáneamente (por ejemplo, en la prevención del desarrollo de abscesos periodontales). La decisión de pasar al paciente a la segunda fase del tratamiento debe ser el resultado de la implementación exitosa de las medidas descritas en la primera fase. [12] En este segundo paso, además, de la instrumentación subgingival se pueden emplear las siguientes intervenciones complementarias: uso de agentes físicos o químicos complementarios, uso de agentes moduladores del huésped complementarios (locales o sistémicos), uso de antimicrobianos subgingivales adyuvantes administrados localmente y uso de antimicrobianos sistémicos complementarios. [39]

El tratamiento no quirúrgico de la periodontitis y más especifica la instrumentación subgingival ha demostrado ser efectiva en prevenir no solo la progresión de la enfermedad sino también la pérdida de dientes [21], incluso si los procedimientos de higiene bucal personal no alcanzan el estándar de perfección requerido, la terapia periodontal no quirúrgica puede retrasar significativamente la pérdida de la inserción periodontal. Las limitaciones de la terapia periodontal no quirúrgica se encuentran dentro de la habilidad adquirida por el operador para obtener acceso a todas las superficies radiculares, áreas de furca y bolsas periodontales profundas [22]. En la instrumentación subgingival, son varias las opciones para elegir por el operador en cuanto a instrumentos, en los cuales se aprecian diferencias en la remoción de depósitos subgingivales duros y blandos. Los dispositivos ultrasónicos, en comparación con los instrumentos manuales, eliminan menos estructura de raíz /

diente y causan menos trauma en los tejidos blandos, son menos dependientes del operador y requieren menos tiempo de tratamiento, mientras que dan como resultado una superficie radicular más rugosa. Por el contrario, la instrumentación manual deja unas superficies dentales mas lisas y pueden eliminar más depósitos de cálculo [23]. Algunos estudios evidencian una reducción significativa en la mayoría de los parámetros clínicos de la enfermedad con ambos instrumentos, pero sin diferencias estadísticamente significativas con respecto a los resultados de los parámetros clínicos periodontales, en el caso de bolsas profundas, algunos diseños de puntas ultrasónicas podrían facilitar el acceso a las bolsas, en comparación con las curetas manuales, quedando a criterio del operador la selección de uno u otro. [24]

La instrumentación subgingival no quirúrgica, como cualquier otro procedimiento presenta limitaciones que se deben tener en cuenta para maximizar su eficacia y obtener los resultados deseados en el paciente, la profundidad de sondaje y la severidad de la enfermedad es una de ellas, estudios muestran que a medida que aumenta la profundidad de sondaje, la instrumentación se vuelve menos eficaz para eliminar la placa bacteriana y el cálculo. Sin embargo, actualmente algunas puntas de ultrasonido de nuevo diseño han mejorado la capacidad del operador para alcanzar áreas de furca de manera más efectiva y penetrar en bolsas más profundas con mayor facilidad, un estudio comparó las puntas de ultrasonidos modificadas y las no modificadas con las curetas manuales en cuanto a su capacidad para alcanzar la zona más apical de la bolsa periodontal en profundidades de sondaje que oscilan entre 5 mm y 8 mm donde la distancia media desde el límite del instrumento hasta la profundidad de la bolsa fue de aproximadamente 0,78 mm para puntas ultrasónicas

modificadas (microultrasónicas), 1,13 mm para puntas ultrasónicas no modificadas y 1,25 mm para curetas manuales. [25]

Otras limitaciones a las que se enfrenta este tratamiento son las lesiones de furca extensas con poca accesibilidad, lesiones infraóseas, malposiciones, tejidos gingivales fibrosados y prótesis o restauraciones subgingivales. Los resultados de una revisión sistemática demostraron que la instrumentación subgingival es un tratamiento eficaz para reducir la inflamación, la profundidad de la bolsa y el número de sitios enfermos en pacientes afectados por periodontitis estos resultados se mostraron consistentes e independientes de la elección del instrumento (sónico/ ultrasónico y manual) o de la técnica empleada (boca completa o por cuadrantes), en esta revisión se estableció una comparación entre los instrumentos manuales y sónicos / ultrasónicos para el tratamiento subgingival concluyendo que no se observaron diferencias significativas en términos de resultados clínicos entre la instrumentación manual y la instrumentación sónica / ultrasónica, señalando únicamente que la instrumentación manual es más sensible a la técnica empleada por el operador y requiere un mayor tiempo clínico. [26]

Otra revisión sistemática mostró que los instrumentos sónicos y ultrasónicos son más ergonómicos en comparación con los instrumentos manuales, pero este problema posiblemente se mitiga cuando los operadores aumentan su experiencia por lo que cabe destacar que el nivel de experiencia es muy importante para poder incrementar la remoción de Biofilm dental al utilizar estos dispositivos. [27] Una revisión de ensayos clínicos controlados, con 6 meses o más de seguimiento, evaluó las diferencias entre el desbridamiento ultrasónico, sónico y manual para el tratamiento de la periodontitis

donde se encontró que la ganancia media en el nivel de inserción clínica, la reducción media en la profundidad de sondaje y la reducción media del sangrado al sondaje fueron similares para los instrumentos manuales, sónicos y ultrasónicos, sin embargo, los procedimientos que utilizan instrumentos sónicos/ultrasónicos tomaron mucho menos tiempo (36,6% menos que la instrumentación manual) y causaron menos traumatismo de los tejidos blandos, pero más daño de la raíz.[28]

La cantidad de tejido dental eliminado y la rugosidad final de la superficie se fueron examinados en un estudio donde se analizaron imágenes de microscopía electrónica de barrido de superficies radiculares y encontraron que los instrumentos romos producían superficies radiculares más suaves en comparación con los instrumentos afilados, sin embargo, no eliminaban por completo todos los depósitos duros ubicados en la superficie radicular. [29]

El uso de agentes químicos adyuvantes a la instrumentación subgingival como lo es la clorhexidina en una proporción del 0.12% de concentración dispone de evidencia basada en estudios sobre el papel de este después de la instrumentación subgingival, en la mayoría de estos estudios se enfocan en puntos tales como: no está claro si esta debería ser una recomendación general para la terapia inicial, puede ser necesario optimizar el control mecánico de la placa antes de considerar la clorhexidina como complemento de la instrumentación subgingival, el estado médico del paciente como factor individual, los efectos adversos (tinciones). [40] Otra revisión sistemática reveló resultados sobre productos que contienen clorhexidina en una concentración del 0.12% demostrando una reducción de la profundidad de las bolsas estadísticamente significativamente mayor después de aplicaciones únicas o

múltiples como complemento al desbridamiento subgingival en el seguimiento a corto plazo (6 a 9 meses), a largo plazo no se encontraron diferencias significativas, también se reveló una reducción significativa de la profundidad de sondaje cuando se usa antibióticos aplicados localmente como complemento del desbridamiento subgingival en el seguimiento a corto plazo (6 a 9 meses). No se observó ningún efecto adyuvante significativo a largo plazo evidente. [41]

Numerosos estudios han demostrado que se requieren concentraciones muy altas de muchos fármacos para obtener actividad bactericida contra muchos de los patógenos periodontales conocidos, por lo que en la actualidad se continúa trabajando para formular sustancias con una mayor efectividad en cuanto a ese aspecto. Por ejemplo, el digluconato de clorhexidina debe estar en contacto con Porphyromonas gingivalis durante 10 minutos en concentraciones de 0,5% a 2%. Actualmente sólo existen dos productos que contienen esas concentraciones, el de gel de clorhexidina al 0.5% o 1.0% y la clorhexidina al 2%. La povidona yodada es otro excelente antimicrobiano tópico que es activo contra la mayoría de las bacterias, virus, hongos y algunas esporas, pero debe estar en contacto con estos patógenos durante al menos 5 minutos en concentraciones entre 0.5% y 10% para alcanzar la actividad bactericida. El triclosán, que es un agente antimicrobiano a base de fenol, también tiene buenos efectos antimicrobianos cuando se expone a biopelículas durante un período de tiempo adecuado. [42]

El uso de antibióticos administrados sistémicamente complementarios a la instrumentación subgingival se describió en un estudio donde no se recomienda su uso rutinario como complemento al desbridamiento subgingival en pacientes con

periodontitis debido al bajo balance riesgo beneficio además de las preocupaciones que establecen sobre la salud general del paciente y el impacto del uso de antibióticos sistémicos en la salud pública. Se puede considerar el uso complementario de antibióticos sistémicos valorando la condición de la enfermedad presente en el paciente (estadios y grados de la periodontitis) (por ejemplo, periodontitis generalizada en estadio III en adultos jóvenes). Los resultados del un metanálisis revelaron una mejora significativa desde el punto de vista estadístico en el desbridamiento subgingival utilizando antibióticos administrados sistémicamente como complemento, en este estudio se observó una reducción de la profundidad de las bosas en el seguimiento a 6 meses de estos casos donde se uso metronidazol y amoxicilina. El uso complementario de metronidazol más amoxicilina dió como resultado un porcentaje positivo adicional significativo en el cierre de las bolsa a los 6 y 12 meses y una reducción en el sangrado al sondaje. El efecto adyuvante de metronidazol más amoxicilina sobre la reducción de la profundidad de sondaje fue más pronunciado en las bolsas inicialmente profundas que en las moderadamente profundas. No hay datos relevantes sobre el efecto a largo plazo (> 12 meses) del uso de antibióticos sistémicos como complemento del desbridamiento subgingival. [42]

Una revisión sistemática actual nos evidencia que el tratamiento se deberá variar según la gravedad, la complejidad y la distribución de la enfermedad (etapas) y el riesgo de progresión (grados) observándose que la amoxicilina en dosis de 500mg junto con el metronidazol con dosis de 250mg durante 7 días, tres veces al día, fue la pauta más indicada por los clínicos. Los beneficios del uso de los antimicrobianos sistémicos en el tratamiento periodontal fueron mayores cuando el paciente se

encontraba en fases más avanzadas de la enfermedad o esta presentaba un comportamiento agresivo. [42]

4.3 Tercera fase del Tratamiento de la Periodontitis.

La tercera fase del tratamiento de la periodontitis está indica a aquellos pacientes que presentan bolsas periodontales que no responden adecuadamente a la segunda fase del tratamiento periodontal luego de su reevaluación periodontal (bolsas periodontales > 4 mm con sangrado al sondaje o bolsas profundas [≥6 mm]), el informe de consenso de la Academia Americana de Periodontología Mundial Workshop, marcó un acuerdo en que un intervalo de 4 a 6 semanas, fue el adecuado para evaluar la respuesta inicial a la terapia sin que ocurriese una repoblación bacteriana de la bolsa.[19;12] El tratamiento quirúrgico de la enfermedad periodontal cumple esencialmente dos propósitos: por un lado, crea la accesibilidad para el correcto desbridamiento profesional de las superficies radiculares desbridadas; por otro, establece una morfología gingival que facilita el autocontrol de placa y mejora la preservación de sus dientes a largo plazo. Esta fase puede incluir las siguientes intervenciones: instrumentación subgingival repetida con o sin terapias complementarias, cirugía periodontal con colgajo de acceso, cirugía periodontal resectiva y cirugía periodontal regenerativa. [43]

En un estudio se observó una reducción de la profundidad de sondaje significativamente mayor en los procedimientos con colgajos de acceso que en los procedimientos de desbridamiento subgingival sin colgajo a un año. La diferencia fue más pronunciada en los sitios inicialmente profundos (≥ 6 mm). En presencia de bolsas residuales profundas (≥ 6 mm) en pacientes con periodontitis en estadio III

después del primer y segundo paso de la terapia periodontal, sugerimos realizar una cirugía de colgajo de acceso. En presencia de bolsas residuales moderadamente profundas (4-5 mm), La cirugía periodontal resectiva logró una reducción de la profundidad de sondaje significativamente mayor que los colgajos de acceso a los 6 meses. [43]

En un reporte de casos donde se trataron dientes con defectos de furca grado II o III mediante amputación o resección y separación radicular y otros fueron tratados con una técnica de tunelización con seguimiento a 10 años se evidenció que las preparaciones en túnel exhiben una tasa de supervivencia peor que la amputación, resección y / o separación de raíces. Sin embargo, hasta ahora, la amputación, resección y / o separación radicular requieren un tratamiento de conducto y, por lo tanto, más esfuerzo y costo que las preparaciones de túnel que se pueden realizar en dientes vitales. Por lo tanto, la preparación del túnel puede ser una opción especialmente para los molares mandibulares vitales con furca de grado III. Sin embargo, en este contexto, debe tenerse en cuenta que, después de la preparación del túnel, los dientes pueden ser más propensos a desarrollar caries radiculares dentro del túnel. [50]

En una revisión sistemática donde se planteó definir la eficacia de la cirugía resectiva en comparación con la cirugía de colgajo de acceso en términos de reducción de la profundidad de sondaje, encontró que las técnicas de reducción / eliminación de bolsas son superiores a los abordajes con colgajo de acceso a corto plazo (6-12) meses después de la cirugía, particularmente en sitios con profundidad de sondaje

inicial de > de 6 mm mientras que en el seguimiento a más largo plazo (36-60 meses) no pudo encontrar diferencias significativas entre los dos abordajes quirúrgicos. [51]

Una revisión sistemática donde se incluyeron un total de 88 artículos publicados entre 1990 y 2019 y que contabilizaron 3.042 pacientes y 3.612 defectos intraóseos, se compararon los procedimientos regenerativos con el raspaje y alisado radicular con colgajo de acceso en términos de ganancia de inserción donde los procedimientos regenerativos mostraron un beneficio complementario en comparación con el raspaje y alisado radicular con colgajo. Tanto el derivado de la matriz del esmalte como la regeneración tisular guiada fueron superiores al raspaje y alisado radicular con colgajo de acceso para mejorar el nivel de inserción. Entre los biomateriales, la adición de material óseo bovino desproteinizado mejoró los resultados clínicos de la regeneración tisular guiada con barreras reabsorbibles y de la regeneración con matriz de esmalte. Esta revisión concluyó que la regeneración tisular guiada con barreras reabsorbibles y de la regeneración con matriz de esmalte en combinación con colgajos de preservación papilar deben considerarse como el tratamiento de elección para bolsas residuales con defectos intraóseos profundos (≥3 mm). [49]

Una revisión sistemática evaluó el desempeño clínico de la cirugía periodontal regenerativa en el tratamiento de defectos de furca en comparación con el raspado y alisado radicular con colgajo de acceso. La búsqueda identificó un total de 575 pacientes con 787 defectos en total. Se encontró en la revisión que las membranas no reabsorbibles + material óseo de injerto mostraron ser el mejor tratamiento para la ganancia de la inserción vertical y la reducción de la profundidad de sondaje. Concluyendo que los resultados de la cirugía regenerativa son superiores a la técnica

de raspado y alisado radicular con colgajo de acceso para el tratamiento de las furcaciones clase II. [51]

Después de completar la terapia periodontal activa, los pacientes con periodontitis tratados con éxito pueden caer en una de dos categorías diagnósticas: pacientes con periodontitis con un periodonto reducido pero sano o pacientes con periodontitis con inflamación gingival, estos sujetos permanecen en alto riesgo de recurrencia / progresión de periodontitis y requieren cuidados periodontales de apoyo específicamente diseñados, que consisten en una combinación de intervenciones preventivas y terapéuticas realizadas a diferentes intervalos que deben incluir: evaluación y monitoreo de la salud sistémica y periodontal , refuerzo de las instrucciones de higiene bucal, motivación del paciente hacia el control continuo de los factores de riesgo, remoción de placa mecánica profesional (PMPR) e instrumentación subgingival localizada en bolsas residuales. Las intervenciones profesionales, también referidas frecuentemente como mantenimiento o terapia periodontales de apoyo, requerirán un sistema de recordatorio estructurado con visitas personalizadas a las necesidades del paciente, que generalmente requieren citas de 45 a 60 minutos. Estas terapias también incluyen el monitoreo de los comportamientos individuales, ya que los pacientes deben cumplir con los regímenes de higiene bucal recomendados y estilos de vida saludables. [44]

Un estudio comparativo del análisis periodontal de CUMPLIDORES REGULARES (personas que acuden a sus tratamientos y escuchan instrucciones de higiene, etc.) y CUMPLIDORES IRREGULARES (personas que no acuden / no realizan las técnicas de higiene correctamente) encontró que los cumplidores regulares

representaban el 26%, el 4% de los dientes y el 2,7% de los sitios examinados mostraban periodontitis recurrente, en comparación con los cumplidores irregulares que presentaron 36,2%, el 6,07% de los dientes y 4,888% de recurrencia de periodontitis. Esto mostró que los cumplidores irregulares mostraron un mayor porcentaje de periodontitis recidivante en todos los aspectos estudiados; también se evidencia que, en el caso de los cumplidores irregulares, estos requirieron tratamiento periodontal no quirúrgico con más frecuencia que los cumplidores regulares. El tratamiento quirúrgico se realizó con mayor frecuencia en los molares, donde el número de pacientes denominados cumplidores irregulares fue mayor que los denominados cumplidores regulares, otra consecuencia evidenciada sobre los cumplidores irregulares fue la pérdida de dientes, la cual fue mayor que en los cumplidores regulares. [45]

Ambos grupos respondieron favorablemente (estado periodontal mejorado) al tratamiento conservador de desbridamiento supragingival mecánico. Respecto al índice de placa (IP) registrado, los cumplidores irregulares tenían un IP más alto que los del grupo de cumplidores regulares, los cumplidores irregulares que se sometieron a procedimientos quirúrgicos tuvieron un IP significativamente más alto que los que recibieron procedimientos no quirúrgicos. Además, los cumplidores habituales que fueron sometidos a procedimientos quirúrgicos o no quirúrgicos no tuvieron diferencias significativas en los valores de IP. [45]

De los resultados primarios especificados para esta revisión, sólo se evaluó la base de datos. Un resultado secundario de la revisión fue la profundidad de sondaje. Otro estudio comparó la administración de doxiciclina tópica como una sola aplicación

complementaria al desbridamiento mecánico versus el desbridamiento solo, y trataron todos los sitios que presentaban profundidad de sondaje de 4 mm o más. Se llegó a la conclusión de que una sola aplicación subgingival de doxiciclina como adición al desbridamiento mecánico tenía solo un beneficio a corto plazo en la reducción de la profundidad de la bolsa, pero no había diferencias entre los grupos a los 12 meses. (46)

5. CONCLUSIÓN

- El tratamiento de la periodontitis se debe llevar a cabo mediante un abordaje terapéutico escalonado preestablecido que, según el estadio de la enfermedad, debe ser incremental, en la primera fase del tratamiento llevamos a cabo las siguientes intervenciones: instrucciones y *métodos psicológicos de motivación para mejorar el cumplimiento de las prácticas de higiene oral por parte del paciente*, *terapias complementarias para la inflamación gingival, eliminación mecánica profesional de placa dental y el control de los factores de riesgos.* En la *segunda fase se lleva a cabo la* instrumentación subgingival la cual puede incluir métodos coadyuvantes. La tercera *fase del tratamiento incluye: la* repetición de la instrumentación subgingival con o sin tratamientos coadyuvantes, cirugía periodontal con colgajo de acceso, cirugía periodontal resectiva y cirugía periodontal regenerativa.

- La instrumentación subgingival manual deja como resultado superficies dentales más lisas y pueden eliminar más depósitos de cálculo, pero aumentan tanto el tiempo de trabajo como la fatiga del operador, por otra parte, la instrumentación subgingival con instrumentos sónicos/ultrasónicos elimina menos estructura del diente, son menos dependiente de la técnica y conllevan un menor tiempo de trabajo, pero deja una superficie más rugosa. Sin embargo, ambas técnicas son igualmente efectivas para eliminar los depósitos de placa y sarro.

- El mantenimiento periodontal exitoso depende de muchos factores. La comunicación y la colaboración del paciente y el odontólogo son fundamentales. La periodontitis es una enfermedad ampliamente prevalente, y la necesidad de comprender no solo el tratamiento adecuado, sino también, el programa de mantenimiento ideal es esencial para la estabilidad y la salud a largo plazo.

6. RESPONSABILIDAD SOCIAL

Los avances en cuanto al tratamiento periodontal, han permitido restaurar casos cada vez más complejos, que le han devuelto la salud oral a muchos pacientes y con ello su bienestar, los profesionales de la salud estamos comprometidos a brindar con nuestros conocimientos las mejores opciones terapéuticas para salvaguardar la integridad de nuestros pacientes

Pacientes y especialistas interactúan de mutuo acuerdo, en un feedback positivo con un objetivo común: satisfacer el creciente interés de los pacientes en obtener una sonrisa saludable. De esta manera se genera más confianza en cada paciente, que nos devuelve una gran satisfacción profesional.

7. BIBLIOGRAFÍA

1. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJL, Marcenes W. Global burden of severe periodontitis in 1990-2010: a systematic review and meta-regression. J Dent Res. 2014;93(11):1045–53.
2. AAP. Parameter on acute periodontal diseases. American Academy of Periodontology. J Periodontol 2000:71: 863–866.
3. Herrera D, Alonso B, de Arriba L, Santa Cruz I, Serrano C, Sanz M. Acute periodontal lesions. Periodontol 2000. 2014; 65:149– 177.
4. Eke PI, Dye B, Wei L, Thornton-Evans G, Genco R. Prevalence of Periodontitis in Adults in the United States: 2009 and 2010. *J Dent Res*. Published online 30 August 2012:1–7
5. Da Silva MK, de Carvalho ACG, Alves EHP, da Silva FRP, Pessoa LDS, Vasconcelos DFP. Genetic factors and the risk of periodontitis development: Findings from a systematic review composed of 13 studies of meta-analysis with 71,531 participants. Int J Dent. 2017; 2017:1914073.
6. Goyal S, Gupta G, Thomas B, Bhat KM, Bhat GS. Stress and periodontal disease. Ind Psychiatry J. 2013;22(1):4–11.
7. Heasman PA, Hughes FJ. Drugs, medications and periodontal disease. Br Dent J. 2014;217(8):411–9.
8. Martinez-Herrera M, Silvestre-Rangil J, Silvestre F-J. Association between obesity and periodontal disease. A systematic review of epidemiological studies and controlled clinical trials. Med Oral Patol Oral Cir Bucal. 2017;22(6):e708–15.
9. Winning L, Linden GJ. Periodontitis and systemic disease. BDJ Team. 2015;2(10):15163.

10. Caccianiga GL, Calzavara D, Baldini A, Baldoni RM, Bascones A. Evaluación de la eficacia clínica del láser Nd:YAP en la terapia periodontal no-quirúrgica: YAP láser in not surgical periodontal therapy. Av Odontoestomatol [Internet]. 2003 Ago [citado 2021 Abr 14] ; 19(4): 177-184.
11. Caton JG, Armitage G, Berglundh T, Chapple ILC, Jepsen S, Kornman KS, et al. A new classification scheme for periodontal and peri-implant diseases and conditions - Introduction and key changes from the 1999 classification. J Clin Periodontol. 2018 Jun; 45 Suppl 20:S1-S8.
12. Sanz M, Herrera D, Kebschull M, et al; On behalf of the EFP Workshop Participants and Methodological Consultants. Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline. J Clin Periodontol. 2020; 47:4–60.
13. Lindhe J, Karring T, Lang N. Periodontología Clínica e Implantología Odontológica. 2005. 845–980 p.
14. Herrera D, Alonso B, de Arriba L, Santa Cruz I, Serrano C, Sanz M. Acute periodontal lesions. Periodontol 2000. 2014;65(1):149–77.
15. Holmstrup P, Westergaard J. Necrotizing periodontal disease. In: Lindhe J, Lang NP, Karring T, editors. Clinical periodontology and implant dentistry, 5th edn. Oxford: Wi- ley-Blackwell, 2008: 459–474.
16. Johnson BD, Engel D. Acute necrotizing ulcerative gingivitis. A review of diagnosis, etiology and treatment. J Periodontol 1986: 57: 141–150.
17. Horning GM, Cohen ME. Necrotizing ulcerative gingivitis, periodontitis, and stomatitis: clinical staging and predisposing factors. J Periodontol 1995: 66: 990–99

18. Papapanou PN, Sanz M, et al. Periodontitis: Consensus report of Workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. J Clin Periodontol. 2018;45(Suppl 20):S162–S170.
19. Tonetti MS, Sanz M. Implementation of the new classification of periodontal diseases: Decision-making algorithms for clinical practice and education. Journal of Clinical Periodontology (2019) 46, 398-405.
20. Sanz-Sánchez I., Bascones-Martínez A. Terapéutica periodontal de mantenimiento. Avances en Periodoncia [Internet]. 2017 Abr [citado 2021 Abr 14]; 29(1): 11-21.
21. Van der Weijden GA (F), Dekkers GJ, Slot DE. Success of non-surgical periodontal therapy in adult periodontitis patients: A retrospective analysis. Int J Dent Hygiene. 2019; 17:309–317.
22. Drisko CH. Nonsurgical periodontal therapy. Periodontol 2000 [Internet]. 2001;25(1):77–88.
23. Suvan J, Leira Y, Moreno F, Graziani F, Derks J, Tomasi C. Subgingival instrumentation for treatment of periodontitis. A systematic review. J Clin Periodontol. 2020; 47:155–175.
24. Barendregt DS, van der Velden U, Timmerman MF and van der Weijden F. Penetration depths with an ultrasonic mini insert compared with a conventional curette in patients with periodontitis and in periodontal maintenance. Journal of Clinical Periodontology 2008; 35:31-36.
25. Dragoo MR. A clinical evaluation of hand and ultrasonic instruments on subgingival debridement. with unmodified and modified ultrasonic inserts. Int J Periodontics Restorative Dent 1992: 12: 310–323.

26. Suvan J, Leira Y, Moreno F, Graziani F, Derks J, Tomasi C. Subgingival instrumentation for treatment of periodontitis. A systematic review. J Clin Periodontol. 2020; 47:155–175.
27. Graetz C, Plaumann A, Rauschenbach S, Bielfeldt J, Dörfer CE and Schwendicke F. Removal of simulated biofilm: a preclinical ergonomic comparison of instruments and operators. Clinical Oral Investigations 2016; 20:1193-1201
28. Tunkel J, Heinecke A, Flemmig TF. A systematic review of efficacy of machine-driven and manual subgingival debridement in the treatment of chronic periodontitis. J Clin Periodontol 2002: 29: 72–81.
29. Vastardis S, Yukna RA, Rice DA, Mercante D. Root surface removal and resultant surface texture with diamond coated ultrasonic inserts: an in vitro and SEM study. J Clin Periodontol 2005: 32: 467–473.
30. Van der Weijden, F. A., & Slot, D. E. Efficacy of homecare regimens for mechanical plaque removal in managing gingivitis: a metareview. Journal of Clinical Periodontology (2015).
31. Trombelli, L., Franceschetti, G., & Farina, R. Effect of professional mechanical plaque removal performed on a long-term, routine basis in the secondary prevention of periodontitis: a systematic review. Journal of Clinical Periodontology, (2015) 42 Suppl 16.
32. Graziani F, Karapetsa D, Alonso B, Herrera D. Nonsurgical and surgical treatment of periodontitis: how many options for one disease? Periodontol 2000. 2017;75(1):152–88.
33. Cepeda MS, Weinstein R, Blacketer C, Lynch MC. Association of flossing/interdental cleaning and periodontitis in adults. J Clin Periodontol. 2017;44:866–871.

34. Caton J, Armitage G, Berglundh T, et al. A new classification scheme for periodontal and peri-implant diseases and conditions - Introduction and key changes from the 1999 classification. J Periodontol. 2018;89(Suppl 1):S1-S8.

35. Tonetti MS, Sanz M. Implementation of the new classification of periodontal diseases: Decision-making algorithms for clinical practice and education. Journal of Clinical Periodontology, 2019 Apr, 46(4), 398-405.

36. van der Weijden F, Slot DE. Oral hygiene in the prevention of periodontal diseases: the evidence. Periodontol 2000. 2011 feb;55(1):104-123.

37. Gomes SC, Romagna R, Rossi V, Corvello PC, Angst PD. Supragingival treatment as an aid to reduce subgingival needs: a 450-day investigation. Brazilian Oral Research. [Internet]. 2014 [cited 2021 Apr 14]; 28(1): 1-7.

38. Ximénez-Fyvie LA, Haffajee AD, Som S, Thompson M, Torresyap G, Socransky SS. The effect of repeated professional supragingival plaque removal on the composition of the supra- and subgingival microbiota. Journal of Clinical Periodontology 2000; 27: 637-647.

39. Sanz M, Kornman K; Working group 3 of joint EFP/AAP Workshop. Periodontitis and adverse pregnancy outcomes: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. Journal of Clinical Periodontology. 2013 Apr; 84(4Suppl):S164-169.

40. Carra MC, Detzen L, Kitzmann J, Woelber JP, Ramseier CA, Bouchard P. Promoting behavioural changes to improve oral hygiene in patients with periodontal diseases: a systematic review. Journal of Clinical Periodontology. 2020 Jul;47 Supple 22:72-89.

41. da Costa LFNP, Amaral CDSF, Barbirato DDS, Leao ATT, Fogacci MF. Chlorhexidine mouthwash as an adjunct to mechanical therapy in chronic

periodontitis: A meta-analysis. Journal of the American Dental Association. 2017 May; 148(5):308-318.

42. Teughels W, Feres M, Oud V, Martín C, Matesanz P, Herrera D. Adjunctive effect of systemic antimicrobials in periodontitis therapy: A systematic review and meta-analysis. J Clin Periodontol. 2020; 47:212–281.
43. Sanz-Sánchez I, Montero E, Citterio F, Romano F, Molina A, Aimetti M. Efficacy of access flap procedures compared to subgingival debridement in the treatment of periodontitis. A systematic review and meta-analysis. J Clin Periodontol. 2020;(Suppl. 22):282–302.
44. Chapple ILC, Mealey BL, Van Dyke TE, Bartold PM, Dommisch H, Eickholz P, Yoshie H. Periodontal health and gingival diseases and conditions on an intact and a reduced periodontium: Consensus report of workgroup 1 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *Journal of Clinical Periodontology*. 2018 Jun; 89 Suppl 1:S74–S84.
45. Costa FO, Cota LOM, Cortelli JR, Cortelli SC, Cyrino RM, Lages EJP, Oliveira AP. Surgical and Non-Surgical Procedures Associated with Recurrence of Periodontitis in Periodontal Maintenance Therapy: 5-Year Prospective Study. PLoS One. 2015 Oct 23;10(10): e0140847.
46. Dannewitz B, Lippert K, Lang NP, Tonetti MS, Eickholz P. Supportive periodontal therapy of furcation sites: non-surgical instrumentation with or without topical doxycycline. Journal of Clinical Periodontology 2009;36(6):514-22.
47. Dommisch H, Walter C, Dannewitz B, Eickholz P. Resective surgery for the treatment of furcation involvement: A systematic review. J Clin Periodontol. 2020; 47:292–391.

48. Nibali L, Koidou VP, Nieri M, Barbato L, Pagliaro U, Cairo F. Regenerative surgery versus access flap for the treatment of intra-bony periodontal defects: A systematic review and meta-analysis. J Clin Periodontol. 2020; 47:320–351.
49. Dannewitz B, Zeidler A, Hüsing J, Saure D, Pfefferle T, Eickholz P, Pretzl B. Loss of molars in periodontally treated patients: Results 10 years and more after active periodontal therapy. J Clin Periodontol. 2016 Jan;43(1):53–62.
50. Polak D, Wilensky A, Antonoglou GN, Shapira L, Goldstein M, Martin C. The efficacy of pocket elimination/reduction compared to access flap surgery: A systematic review and meta-analysis. J Clin Periodontol. 2020; 47:303–319.
51. Jepsen S, Gennai S, Hirschfeld J, Kalemaj Z, Buti J, Graziani F. Regenerative surgical treatment of furcation defects: A systematic review and Bayesian network meta-analysis of randomized clinical trials. J Clin Periodontol. 2019; 47:269–374

8. ANEXOS

CLINICAL REVIEW

N.J. Kassebaum[1,2], E. Bernabé[3], M. Dahiya[4], B. Bhandari[3], C.J.L. Murray[1], and W. Marcenes[4]*

[1]Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA; [2]Department of Anesthesiology and Pain Medicine, Seattle Children's Hospital, Seattle, WA, USA; [3]Division of Population and Patient Health, King's College London Dental Institute, London, UK; and [4]Institute of Dentistry, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK; *corresponding author, w.marcenes@qmul.ac.uk

J Dent Res 93(11):1045-1053, 2014

Global Burden of Severe Periodontitis in 1990-2010: A Systematic Review and Meta-regression

ABSTRACT

We aimed to consolidate all epidemiologic data about severe periodontitis (SP) and, subsequently, to generate internally consistent prevalence and incidence estimates for all countries, 20 age groups, and both sexes for 1990 and 2010. The systematic search of the literature yielded 6,394 unique citations. After screening titles and abstracts, we excluded 5,881 citations as clearly not relevant to this systematic review, leaving 513 for full-text review. A further 441 publications were excluded following the validity assessment. A total of 72 studies, including 291,170 individuals aged 15 yr or older in 37 countries, were included in the metaregression based on modeling resources of the Global Burden of Disease 2010 Study. SP was the sixth-most prevalent condition in the world. Between 1990 and 2010, the global age-standardized prevalence of SP was static at 11.2% (95% uncertainty interval: 10.4%-11.9% in 1990 and 10.5%-12.0% in 2010). The age-standardized incidence of SP in 2010 was 701 cases per 100,000 person-years (95% uncertainty interval: 599-823), a nonsignificant increase from the 1990 incidence of SP. Prevalence increased gradually with age, showing a steep increase between the third and fourth decades of life that was driven by a peak in incidence at around 38 yr of age. There were considerable variations in prevalence and incidence between regions and countries. Policy makers need to be aware of a predictable increasing burden of SP due to the growing world population associated with an increasing life expectancy and a significant decrease in the prevalence of total tooth loss throughout the world from 1990 to 2010.

KEY WORDS: periodontal diseases, oral health, world health, statistics, prevalence, incidence.

DOI: 10.1177/0022034514552491

Received May 26, 2014; Last revision August 19, 2014; Accepted August 23, 2014

A supplemental appendix to this article is published electronically only at http://jdr.sagepub.com/supplemental.

INTRODUCTION

The 1999 World Workshop for the Classification of Periodontal Diseases and Conditions identified 3 periodontitis types based on specific etiologic formulation: chronic periodontitis, aggressive periodontitis, and periodontitis as a manifestation of systemic disease (Armitage, 2004). Previous attempts to synthesize the epidemiology of periodontal diseases have shown that 5% to 20% of any population suffers from severe periodontitis (SP), while mild to moderate periodontitis affects a majority of adults (Dye, 2012; Petersen and Ogawa, 2012). A number of continental reviews have also been conducted over the past decade, which varied in terms of the quantity and quality of included studies (Albandar, 2002; Baelum and Scheutz, 2002; Corbet *et al.*, 2002; Gjermo *et al.*, 2002; Sheiham and Netuveli, 2002). Only Dye (2012) provided some details of the methods used for selection of studies. Yet, data on incidence of SP is scarce (Burt *et al.*, 2005). A good understanding of current trends in SP is important for planning dental services and workforce, as well as for updating the dental curriculum.

Quantifying periodontal diseases in a meaningful and reproducible manner has been an ongoing challenge for oral epidemiologists and clinicians. Several classification systems have been developed to describe clinical manifestations of periodontitis, most of which have their own case definitions and scales for quantifying severity. Unification under a single case definition has been a challenge, hitherto without a satisfying solution (Meisel and Kocher, 2009). Heterogeneity of case definitions affects comparison of the results and leads to either overestimation or underestimation of disease prevalence (Costa *et al.*, 2009). The World Health Organization introduced the Community Periodontal Index of Treatment Needs (CPITN) in 1987, recommending the use of pocket depth (PD) as a criterion for identifying cases of SP (World Health Organization, 1987). Influential oral health surveys, such the 2009 Adult Dental Health Survey in the United Kingdom (Kelly *et al.*, 2001; O'Sullivan *et al.*, 2011) and the National Health and Nutrition Examination Surveys in the United States (Dye *et al.*, 2007; Dye *et al.*, 2008; Dye *et al.*, 2011), have measured attachment loss (AL) in addition to PD.

A systematic review of case definitions and methods used to identify periodontitis found that only 15 of 104 relevant publications actually gave a quantitative case definition of periodontitis; among these 15, there was heterogeneity in terms of indices used and areas of mouth surveyed (Savage *et al.*, 2009). Recently, the number of teeth and sites around each tooth to be

(1)

Parameter On Acute Periodontal Diseases*

The American Academy of Periodontology has developed the following parameter on the treatment of acute periodontal diseases. Patients should be informed about the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to treat acute periodontal diseases appropriately can result in progressive loss of periodontal supporting tissues, an adverse change in prognosis, and could result in tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:863-866.

KEY WORDS

Disease progression; health education, dental; periodontal disease/therapy; patient care planning; risk factors.

CLINICAL DIAGNOSIS

Definition

Acute periodontal diseases are clinical conditions of rapid onset that involve the periodontium or associated structures and may be characterized by pain or discomfort and infection. They may or may not be related to gingivitis or periodontitis. They may be localized or generalized, with possible systemic manifestations.

Clinical Features

Acute periodontal infections include:

1. Gingival abscess;
2. Periodontal abscess;
3. Necrotizing periodontal diseases;
4. Herpetic gingivostomatitis;
5. Pericoronal abscess (pericoronitis);
6. Combined periodontal-endodontic lesions.

GINGIVAL ABSCESS

Clinical Diagnosis

Definition. A localized purulent infection that involves the marginal gingiva or interdental papilla.

Clinical features. Clinical features may include combinations of the following signs and symptoms: a localized area of swelling in the marginal gingiva or interdental papillae, with a red, smooth, shiny surface. The lesion may be painful and appear pointed. A purulent exudate may be present.

Therapeutic Goals

The goal of therapy for a gingival abscess is the elimination of the acute signs and symptoms as soon as possible.

Treatment Considerations

Treatment considerations include drainage to relieve the acute symptoms and mitigation of the etiology.

Outcomes Assessment

1. The desired outcome of therapy in patients with a gingival abscess should be the resolution of the signs and symptoms of the disease and the restoration of gingival health and function.
2. Areas where the gingival condition does not resolve may be characterized by recurrence of the abscess or change to a chronic condition.
3. Factors which may contribute to the nonresolution of this condition may include the failure to remove the cause of irritation, incomplete debridement, or inaccurate diagnosis.
4. In patients where the gingival condition does not resolve, additional therapy may be required.

PERIODONTAL ABSCESS

Clinical Diagnosis

Definition: A localized purulent infection within the tissues adjacent to the periodontal pocket that may lead to the destruction of periodontal ligament and alveolar bone.

Clinical features. Clinical features may include combinations of the following signs and symptoms: a smooth, shiny swelling of the gingiva; pain, with the area of swelling tender to touch; a purulent exudate;

* Approved by the Board of Trustees, American Academy of Periodontology, May 1998.

Update on Prevalence of Periodontitis in Adults in the United States: NHANES 2009 to 2012

Paul I. Eke,* Bruce A. Dye,† Liang Wei,‡ Gary D. Slade,§ Gina O. Thornton-Evans,‖ Wenche S. Borgnakke,¶ George W. Taylor,# Roy C. Page,** James D. Beck,§ and Robert J. Genco††

Background: This report describes prevalence, severity, and extent of periodontitis in the US adult population using combined data from the 2009 to 2010 and 2011 to 2012 cycles of the National Health and Nutrition Examination Survey (NHANES).

Methods: Estimates were derived for dentate adults, aged ≥30 years, from the US civilian non-institutionalized population. Periodontitis was defined by combinations of clinical attachment loss (AL) and periodontal probing depth (PD) from six sites per tooth on all teeth, except third molars, using standard surveillance case definitions. For the first time in NHANES history, sufficient numbers of non-Hispanic Asians were sampled in 2011 to 2012 to provide reliable estimates of their periodontitis prevalence.

Results: In 2009 to 2012, 46% of US adults, representing 64.7 million people, had periodontitis, with 8.9% having severe periodontitis. Overall, 3.8% of all periodontal sites (10.6% of all teeth) had PD ≥4 mm, and 19.3% of sites (37.4% teeth) had AL ≥3 mm. Periodontitis prevalence was positively associated with increasing age and was higher among males. Periodontitis prevalence was highest in Hispanics (63.5%) and non-Hispanic blacks (59.1%), followed by non-Hispanic Asian Americans (50.0%), and lowest in non-Hispanic whites (40.8%). Prevalence varied two-fold between the lowest and highest levels of socio-economic status, whether defined by poverty or education.

Conclusions: This study confirms a high prevalence of periodontitis in US adults aged ≥30 years, with almost fifty-percent affected. The prevalence was greater in non-Hispanic Asians than non-Hispanic whites, although lower than other minorities. The distribution provides valuable information for population-based action to prevent or manage periodontitis in US adults. *J Periodontol 2015;86:611-622.*

KEY WORDS

Dental health surveys; epidemiology; periodontal diseases; periodontitis; population surveillance; United States.

* Division of Population Health, Centers for Disease Control and Prevention (CDC), Atlanta, GA.
† Division of Health and Nutrition Examination Surveys, CDC, Hyattsville, MD.
‡ DB Consulting Group, Atlanta, GA.
§ Department of Dental Ecology, University of North Carolina School of Dentistry, Chapel Hill, NC.
‖ Division of Oral Health, CDC, Atlanta, GA.
¶ Department of Periodontics and Oral Medicine, University of Michigan School of Dentistry, Ann Arbor, MI.
# Department of Preventive and Restorative Dental Sciences, University of California School of Dentistry, San Francisco, CA.
** Department of Periodontics, University of Washington School of Dentistry, Seattle, WA.
†† Department of Oral Biology, State University of New York School of Dental Medicine, Buffalo, NY.

doi: 10.1902/jop.2015.140520

(3)

Hindawi
International Journal of Dentistry
Volume 2017, Article ID 1914073, 9 pages
https://doi.org/10.1155/2017/1914073

Review Article

Genetic Factors and the Risk of Periodontitis Development: Findings from a Systematic Review Composed of 13 Studies of Meta-Analysis with 71,531 Participants

Maélson Klever da Silva,[1] Antonio Carlos Gonçalves de Carvalho,[1] Even Herlany Pereira Alves,[1] Felipe Rodolfo Pereira da Silva,[1,2] Larissa dos Santos Pessoa,[1,2] and Daniel Fernando Pereira Vasconcelos[1,2,3,4]

[1]*Laboratory of Analysis and Histological Processing (LAPHIS), Federal University of Piaui, Parnaiba, PI, Brazil*
[2]*Postgraduate Program in Biomedical Sciences, Federal University of Piaui, Parnaiba, PI, Brazil*
[3]*Postgraduate Program in Biotechnology, Federal University of Piaui, Parnaiba, PI, Brazil*
[4]*Postgraduate Program in Dentistry, Federal University of Piaui, Teresina, PI, Brazil*

Correspondence should be addressed to Daniel Fernando Pereira Vasconcelos; vasconcelos@ufpi.edu.br

Received 2 December 2016; Revised 28 February 2017; Accepted 30 March 2017; Published 26 April 2017

Academic Editor: Tommaso Lombardi

Purpose. This work aimed to synthesize the results of recent meta-analysis focusing on polymorphism in inflammatory mediators and its relation with the risk of periodontitis development. *Materials and Methods.* A systematic search was conducted using databases for publications prior to October 2016. Three examiners extracted data from articles with a clear association between polymorphisms in the inflammatory mediator gene and the development of periodontitis through meta-analysis using the fixed or randomized statistical models to calculate the Odds Ratio with values of $P < 0.05$ considered significant. *Results.* A total of 13 meta-analysis articles with 25 polymorphisms in seven interleukins (IL-1A, IL-1B, IL-4, IL-6, IL-8, IL-10, and IL-18), three cellular receptors (Fcγ receptors: FCGR2A, FCGR3A, and FCGR3B), and five inflammatory mediators (COX-2, MMP-2, MMP-3, MMP-8, and MMP-9), with a total of 71,531 participants, approaching different classifications of the disease. *Conclusion.* The study demonstrated that polymorphisms in the IL-1A, IL-1B, IL-6, IL-10, MMP-3 (chronic form), and MMP-9 (chronic form) polymorphisms were significantly associated with the risk of developing periodontitis, whereas other polymorphisms in the IL-4, IL-8, IL-18, Fcγ, COX-2, MMP-2, MMP-3 (aggressive), MMP-8, and MMP-9 (aggressive) polymorphisms had no significant association with risk of developing periodontitis.

1. Introduction

Periodontitis is a multifactorial inflammatory disease and both environmental and genetic factors play a major role in the progression of the disease with consequent tissue destruction around the dental roots, and alveolar bone is associated with systemic alterations such as diabetes [1], changes in the liver [2], cardiovascular diseases [3], and even osteoporosis [4].

The high risk in the progression of periodontitis is directly associated with the biofilm found in the gingival sulcus, in which both amount and presence of specific species of bacteria represent risk factors [5]. However, the genetic variability of host may influence individual susceptibility to disease development, so as to determine the clinical aspects and rate of periodontitis progression.

The evidence that periodontitis is a complex disease of multifactorial etiology has resulted in the development of focused researches in the identification of molecular markers capable of determining the risk of disease development [6].

Recently, investigations on factors of susceptibility to periodontitis have been gaining focus on genes of immunoregulatory molecules, such as cytokines, chemokines, membrane surface receptors, and antigen recognition proteins [5]. Cytokines such as interleukins (IL-1A, IL-1B, IL-6, and IL-10, among others), surface receptors such as the Fcγ family (FCGRs), and cyclooxygenase- (COX-) 2 and matrix

(4)

Industrial Psychiatry Journal
Publication of the Association of Industrial Psychiatry of India

Ind Psychiatry J. 2013 Jan-Jun; 22(1): 4–11.
doi: 10.4103/0972-6748.123585
PMCID: PMC3895311
PMID: 24459366

Stress and periodontal disease: The link and logic!!

Sachin Goyal, Garima Gupta,[1] Betsy Thomas,[2] K. M. Bhat,[2] and G. S. Bhat[3]

Abstract

Go to:

Stress is an equated response to constant adverse stimuli. At one point or another everybody suffers from stress. Stress is compatible with good health, being necessary to cope with the challenges of everyday life. Problems start when the stress response is inappropriate to the intensity of the challenge. Psychological stress can down regulate the cellular immune response. Communication between the central nervous system and the immune system occurs via a complex network of bidirectional signals linking the nervous, endocrine, and immune systems. Stress disrupts the homeostasis of this network, which in turn, alters immune function. Direct association between periodontal disease and stress remains to be proven, which is partly due to lack of an adequate animal models and difficulty to quantifying the amount and duration of stress and also there are many factors influencing the incidence and severity of periodontal disease. Nevertheless, more recent studies indicate that psychosocial stress represents a risk indicator for periodontal disease and should be addressed before and during treatment. This paper discusses how stress may modulate host response to bacteria and influence the course and progression of periodontal disease.

Keywords: Immunosuppression, inflammatory periodontal disease, psychosocial stressors, stress

(5)

Drugs, medications and periodontal disease

P. A. Heasman*[1] and F. J. Hughes[2]

PRACTICE

IN BRIEF

- Highlights the increasing UK population being prescribed drugs that might affect the periodontal tissues.
- Reviews the more common drugs that can cause changes in healthy and inflamed periodontal tissues.
- Describes the clinical changes that may be observed.
- Considers the clinical relevance of these issues in general dental practice.

This paper reviews the effects that drugs may have on the gingival and periodontal tissues. Drug-induced gingival overgrowth has been recognised for over 70 years but is becoming a more prevalent occurrence with wider use of antihypertensive and immunosuppressant drugs. The anti-inflammatory steroids, non-steroidal drugs and anti-TNF-α agents might all be expected to exert a dampening effect on chronic periodontitis although the evidence is somewhat equivocal and none of these drugs has emerged as potentially valuable adjuncts to treat periodontal disease. Desquamative gingivitis is a clinical appearance of aggressive gingival inflammation with which a number of drugs have been associated and the oral contraceptives have also been implicated in the development of gingival inflammation. Patients who are prescribed bisphosphonates and anti-platelet drugs are at risk of serious side effects following more invasive dental procedures including extractions and surgical treatments although timely, conventional management of periodontal disease may be undertaken to reduce periodontal inflammation, prevent disease progression and ultimately the need for extractions.

INTRODUCTION

The healthy periodontium is a functional and biological unit that comprises numerous different cell types (for example, fibroblasts, macrophages and inflammatory cells) and connective tissue components (fibres and an extracellular matrix) as well as a rich microvasculature and neural complex. This dynamic, anatomical compartment retains the ability to undergo physiological turnover and remodelling and as such, may be influenced by the actions of a number of drugs. Similarly, when the periodontal tissues are affected by inflammatory disease they become host to many pro-inflammatory cytokine networks which may in turn be affected by drugs that patients may be taking for other medical conditions.

Although the data of total number of patients in the population regularly taking these medications do not appear to be readily available, we have made an estimate of the frequency of a number of medications discussed in this review, using data from the UK Biobank cohort. The UK Biobank is a cohort of 500,000 people between the ages of 40-69 collected between 2006 and 2010, which is reportedly demographically representative of the UK population.[1] There are currently approximately 31 million people over the age of 40 and taking the figures from the UK Biobank data we have calculated estimates of medication use from this[2] (Table 1).

Further, 10 million people in the UK are over 65 years old and projections suggest that by 2050, this population will have nearly doubled to around 19 million.[3] One in six of the UK population is currently aged 65 and over and by 2050 this will be one in four. Most people over 65 live with a long-term medical condition,[4] and most people over 75 live with two or more.[5,6] Such common and chronic conditions such as hypertension necessitate the prescription of often multiple medicines and in 2013 for example, 1.0 billion prescription items were dispensed in the UK: an increase of 3% (30 million items) on the number dispensed in 2012.[7] Further, the demand for organ transplants in the UK is increasing and this will continue as the population continues to age and with an increasing prevalence of obesity and diseases such as cancer, hypertension, diabetes, and those related to alcohol consumption. The number of transplants undertaken in 2012-13 was over 4,200.[8]

The general dental practitioner is thus often faced with patients with increasingly complex medical histories which may affect their periodontal and oral health. The aim of the paper is to review the more common drugs that can affect the periodontium either in its healthy or inflamed condition.

GINGIVAL OVERGROWTH

Gingival overgrowth or gingival enlargement are terms used to describe drug-related gingival lesions that have previously described as gingival hyperplasia or gingival hypertrophy; gingival overgrowth is an overarching clinical description which does not necessitate a diagnosis based upon the histologic composition of the affected gingival tissues.

Drug-induced gingival overgrowth (DIGO) or enlargement is a well-recognised condition that has been researched extensively over the last four decades. Three types of drugs in particular have been reported as associated with DIGO, namely phenytoin, ciclosporin and calcium-channel blockers. The clinical appearances of DIGO show similar features irrespective of the drug or drugs that are causative (Table 2). The first signs of change occur about 1-3 months after the start of dosing and there would appear to be minimal threshold plasma levels of the drugs below which DIGO is unlikely to occur.[17,25,26] The interdental papillae become swollen with a granular, pebbly surface which may enlarge further to become nodular and lobulated as the tissues coalesce to affect the marginal and attached gingiva. The overgrowth predominantly affects the buccal and

[1]Professor of Periodontology, School of Dental Sciences, Framlington Place, Newcastle upon Tyne; [2]Professor of Periodontology, Dental Institute, King's College London
*Correspondence to: Professor Peter Heasman
Email: p.a.heasman@ncl.ac.uk

Refereed Paper
Accepted 8 August 2014
DOI: 10.1038/sj.bdj.2014.905
©British Dental Journal 2014; 217: 411–419

(6)

Journal section: Medically compromised patients in Dentistry
Publication Types: Review

doi:10.4317/medoral.21786
http://dx.doi.org/doi:10.4317/medoral.21786

Association between obesity and periodontal disease. A systematic review of epidemiological studies and controlled clinical trials

Mayte Martinez-Herrera [1], Javier Silvestre-Rangil [2], Francisco-Javier Silvestre [3,4]

[1] Dentist. Grant fellow (VALI+d) of the Regional Ministry Education of Valencian Community. Special Patients Unit, Department of Stomatology, University of Valencia, Valencia, Spain
[2] DDS, PhD. Associate Professor, Special Patients Unit, Department of Stomatology, University of Valencia, Valencia, Spain
[3] DDS, PhD. Assistant Professor, Special Patients Unit, Department of Stomatology, University of Valencia, Valencia, Spain
[4] MD. Service of Stomatology, University Hospital Doctor Peset, Av. Gaspar Aguilar 90, 46017 Valencia, Spain

Correspondence:
Clínica Odontológica Universitaria
Unidad de Odontología en Pacientes Especiales
Gascó Oliag 1, 46021 -Valencia, Spain
francisco.silvestre@uv.es

Martinez-Herrera M, Silvestre-Rangil J, Silvestre FJ. Association between obesity and periodontal disease. A systematic review of epidemiological studies and controlled clinical trials. **Med Oral Patol Oral Cir Bucal.** 2017 Nov 1;22 (6):e708-15.
http://www.medicinaoral.com/medoralfree01/v22i6/medoralv22i6p708.pdf

Received: 15/12/2016
Accepted: 21/06/2017

Article Number: 21786 http://www.medicinaoral.com/
© Medicina Oral S. L. C.I.F. B 96689336 - pISSN 1698-4447 - eISSN: 1698-6946
eMail: medicina@medicinaoral.com
Indexed in:
Science Citation Index Expanded
Journal Citation Reports
Index Medicus, MEDLINE, PubMed
Scopus, Embase and Emcare
Indice Médico Español

Abstract
Background: Obesity is a very prevalent chronic disease worldwide and has been suggested to increase susceptibility of periodontitis. The aim of this paper was to provide a systematic review of the association between obesity and periodontal disease, and to determine the possible mechanisms underlying in this relationship.
Material and Methods: A literature search was carried out in the databases PubMed-Medline and Embase. Controlled clinical trials and observational studies identifying periodontal and body composition parameters were selected. Each article was subjected to data extraction and quality assessment.
Results: A total of 284 articles were identified, of which 64 were preselected and 28 were finally included in the review. All the studies described an association between obesity and periodontal disease, except two articles that reported no such association. Obesity is characterized by a chronic subclinical inflammation that could exacerbate other chronic inflammatory disorders like as periodontitis.
Conclusions: The association between obesity and periodontitis was consistent with a compelling pattern of increased risk of periodontitis in overweight or obese individuals. Although the underlying pathophysiological mechanism remains unclear, it has been pointed out that the development of insulin resistance as a consequence of a chronic inflammatory state and oxidative stress could be implicated in the association between obesity and periodontitis. Further prospective longitudinal studies are needed to define the magnitude of this association and to elucidate the causal biological mechanisms.

Key words: *Periodontal disease, periodontitis, periodontal infection, obesity, abdominal obesity.*

Introduction
Obesity has been described as one of the most neglected public health problems, affecting both developed and developing countries (1). The prevalence of obesity has increased substantially in the last few decades (2,3). In 2014, the World Health Organization (WHO) estimated that around 600 million obese adults worldwide were obese (4), and a further increase is expected in the future due to increased consumption of high-calorie diets and a sedentary lifestyle.

Periodontitis and systemic disease

Lewis Winning[1], Gerard J. Linden[2]

In recent years there has been considerable interest in possible links between periodontal disease and systemic diseases. The general public are increasingly aware that such links may exist and in some cases are concerned about the implications for them as individuals. Nearly half of all adults in the United Kingdom have some form of periodontal disease,[1] and as such present to dental practices every day. It is essential that all members of the dental team are aware of the periodontitis-systemic disease link, and can provide clear evidence-based advice and information to patients. The aim of this article is to summarise the current state of knowledge so that members of the dental team can convey appropriate advice and guidance to patients.

Basis for a possible relationship – Historical and Current

The notion that a relationship between oral disease and systemic disease might exist goes back over a century. Around 1900 William Hunter, a British Doctor, identified links between oral sepsis and disease of other organs in the body and this was termed the theory of 'focal infection'.[2] The proponents relied heavily on clinical experience highlighting cases where the removal of infected teeth produced improvements in general health. These observations lacked the rigor of modern scientific studies and the theory of focal infection was later discarded.

Skipping forward to more recent times, evidence from well-designed studies began to emerge in the late 1980's of possible linkages between chronic periodontal disease and other systemic diseases.[3,4] Since then there has been an exponential rise in the number of studies that have investigated links between periodontal disease and various diseases with the main areas of interest being: atherosclerotic cardiovascular disease,[5] diabetes,[6] and adverse pregnancy outcome.[7] Associations between periodontitis and many other diseases and conditions have also been reported including respiratory disease; chronic kidney disease; rheumatoid arthritis; cognitive impairment; obesity; metabolic syndrome; and cancer.[8] (*Fig. 1*)

[1] *Research Fellow, Centre for Public Health, School of Medicine Dentistry and Biomedical Sciences, Queen's University Belfast*

[2] *Professor of Periodontology, Centre for Public Health, School of Medicine Dentistry and Biomedical Sciences, Queen's University Belfast*

Possible mechanisms

Two main pathogenic mechanisms have been described to explain how periodontal disease could contribute to systemic disease.

1. **Direct mechanism**: As chronic periodontitis progresses, the epithelium lining periodontal pockets becomes ulcerated providing a direct entry point for periodontal bacteria into the systemic circulation. The circulating bacteria could then have direct effects on certain organs, for example periodontal bacteria have been detected in thrombi from patients with acute myocardial infarction suggesting a possible role in the pathological changes

(8)

Evaluación de la eficacia clínica del láser Nd: YAP en la terapia periodontal no-quirúrgica

Caccianiga GL*, Calzavara D**, Baldini A***, Baldoni RM****, Bascones A*****

RESUMEN

OBJETIVO. Testar la eficacia clínica de láser Nd:YAP en la terapia periodontal no-quirúrgica.
MATERIALES Y MÉTODOS. Por medio de la medición de los índices de la enfermedad periodontal (GI, PPD, CAL) realizada al principio y a las 2,4, 6, 8, 10 semanas tras la terapia, se ha confrontado la eficacia del solo tratamiento de Raspado y Alisado Radicular (RAR), de la sola radiación láser, de la radiación láser seguida del RAR a la distancia de 4 semanas , del RAR seguido a distancia de 4 semanas del tratamiento láser.
RESULTADOS. La mejor terapia no-quirúrgica de las bolsas periodontales se ha demostrado sin duda la radiación láser seguida a la distancia de 4 semanas, también en relación al GI, que PPD, que al CAL.
DISCUSIÓN. Cuando combinados en el correcto protocolo, la terapia láser y el RAR evidencian una acción sinérgica y de amplificación.
CONCLUSIÓNES. El empleo clínico del láser puede representar un papel importante en la terapaia periodontal.

Palabras clave: terapia periodontal, láser, Raspado y Alisado Radicular.

SUMMARY

AIM. To evaluate the clinical efficiency of Nd:YAP laser in not surgical periodontal therapy.
MATERIALS AND METHODS. By means of measurements of clinical index (GI, PPD, CAL) before and after 2, 4, 6, 8, 10 weeks of therapy, the Authors have compared the clinical efficiency of Scaling and Root Planing (SRP) by itself, of laser irradiation by itself, of SRP 4 weeks after laser irradiation and of laser irradiation 4 weeks after SRP.
RESULTS. It suggests that, either by GI, or PPD, or CAL, the best not surgical periodontal therapy is the SRP 4 weeks after laser irradiation.
DISCUSSION. If applied in the correct combination, the laser therapy end the SRP have an synergic and amplifying action.
CONCLUSIONS. The clinical laser approach can to have a considerable importance in the periodontal therapy.

Key words: periodontal therapy, laser, Scaling and Root Planing

* Profesor a contrato de Medicina y Quirurgía, Univerità degli Studi di Milano-Bicocca.
** Odontólogo y Master Periodoncia Universidad Complutense.
*** Odontólogo frequentador.
**** Profesor Ordinario Medicina y Quirurgía Facoltà; Università degli Studi di Milano-Bicocca
***** Catedrático de Medicina Bucal y Periodoncia. Universidad Complutense de Madrid.

Caccianiga GL, Calzavara D, Baldini A, Baldoni RM, Bascones A. Evaluación de la eficacia clínica del láser Nd: YAP en la terapia periodontal no-quirúrgica. *Av. Odontoestomatol* 2003; 19-4: 177-184

(9)

Received: 9 March 2018 | Revised: 19 March 2018 | Accepted: 19 March 2018

DOI: 10.1002/JPER.18-0157

JOURNAL OF Periodontology

2017 WORLD WORKSHOP

A new classification scheme for periodontal and peri-implant diseases and conditions – Introduction and key changes from the 1999 classification

Jack G. Caton[1] | Gary Armitage[2] | Tord Berglundh[3] | Iain L.C. Chapple[4] | Søren Jepsen[5] | Kenneth S. Kornman[6] | Brian L. Mealey[7] | Panos N. Papapanou[8] | Mariano Sanz[9] | Maurizio S. Tonetti[10]

[1]Periodontics, Eastman Institute for Oral Health, University of Rochester, Rochester, NY, USA
[2]School of Dentistry, University of California San Francisco, San Francisco, CA, USA
[3]Department of Periodontology, Institute of Odontology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
[4]Periodontal Research Group, Institute of Clinical Sciences, College of Medical & Dental Sciences, University of Birmingham, Birmingham, UK
[5]Department of Periodontology, Operative and Preventive Dentistry, University of Bonn, Bonn, Germany
[6]University of Michigan School of Dentistry, Ann Arbor, MI, USA
[7]University of Texas Health Science Center, San Antonio, TX, USA
[8]Columbia University College of Dental Medicine, New York, NY, USA
[9]Facultad de Odontologia, Universidad Complutense Madrid, Madrid, Spain
[10]Periodontology, Faculty of Dentistry, University of Hong Kong, Hong Kong, SAR China

Correspondence
Jack Caton, Professor and Chair, Department of Periodontology, Eastman Institute for Oral Health, University of Rochester, 625 Elmwood Avenue, Rochester, NY 14620
Email: jack_caton@urmc.rochester.edu

Sources of Funding
The workshop was planned and conducted jointly by the American Academy of Periodontology and the European Federation of Periodontology with financial support from the American Academy of Periodontology Foundation, Colgate, Johnson & Johnson Consumer Inc., Geistlich Biomaterials, SUNSTAR, and Procter & Gamble Professional Oral Health.

The proceedings of the workshop were jointly and simultaneously published in the *Journal of Periodontology* and *Journal of Clinical Periodontology*.

Abstract

A classification scheme for periodontal and peri-implant diseases and conditions is necessary for clinicians to properly diagnose and treat patients as well as for scientists to investigate etiology, pathogenesis, natural history, and treatment of the diseases and conditions. This paper summarizes the proceedings of the World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions. The workshop was co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) and included expert participants from all over the world. Planning for the conference, which was held in Chicago on November 9 to 11, 2017, began in early 2015.

An organizing committee from the AAP and EFP commissioned 19 review papers and four consensus reports covering relevant areas in periodontology and implant dentistry. The authors were charged with updating the 1999 classification of periodontal diseases and conditions[1] and developing a similar scheme for peri-implant diseases and conditions. Reviewers and workgroups were also asked to establish pertinent case definitions and to provide diagnostic criteria to aid clinicians in the use of the new classification. All findings and recommendations of the workshop were agreed to by consensus.

(10)

Received: 29 March 2020 | Accepted: 3 April 2020
DOI: 10.1111/jcpe.13290

CLINICAL PRACTICE GUIDELINE

Journal of Clinical Periodontology WILEY

Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline

Mariano Sanz[1] | David Herrera[1] | Moritz Kebschull[2,3,4] | Iain Chapple[2,3] | Søren Jepsen[5] | Tord Berglundh[6] | Anton Sculean[7] | Maurizio S. Tonetti[8,9] | On behalf of the EFP Workshop Participants and Methodological Consultants

[1]ETEP (Etiology and Therapy of Periodontal and Peri-implant Diseases) Research Group, University Complutense of Madrid, Madrid, Spain

[2]Periodontal Research Group, Institute of Clinical Sciences, College of Medical and Dental Sciences, The University of Birmingham, Birmingham, UK

[3]Birmingham Community Healthcare NHS Trust, Birmingham, UK

[4]Division of Periodontics, Section of Oral, Diagnostic and Rehabilitation Sciences, College of Dental Medicine, Columbia University, New York, NY, USA

[5]Department of Periodontology, Operative and Preventive Dentistry, University Hospital Bonn, Bonn, Germany

[6]Department of Periodontology, Institute of Odontology, The Sahlgrenska Academy, University of Gothenburg, Göteborg, Sweden

[7]Department of Periodontology, School of Dental Medicine, University of Bern, Bern, Switzerland

[8]Division of Periodontology and Implant Dentistry, Faculty of Dentistry, The University of Hong Kong, Hong Kong, Hong Kong

[9]Department of Oral and Maxillo-facial Implantology, Shanghai Key Laboratory of Stomatology, National Clinical Research Centre for Stomatology, Shanghai Ninth People Hospital, School of Medicine, Shanghai Jiao Tong University, Shanghai, China

Correspondence
Mariano Sanz, ETEP (Etiology and Therapy of Periodontal and Peri-implant Diseases) Research Group Faculty of Odontology, University Complutense of Madrid, Plaza Ramón y Cajal s/n (Ciudad Universitaria),

Abstract

Background: The recently introduced 2017 World Workshop on the classification of periodontitis, incorporating stages and grades of disease, aims to link disease classification with approaches to prevention and treatment, as it describes not only disease severity and extent but also the degree of complexity and an individual's risk. There is, therefore, a need for evidence-based clinical guidelines providing recommendations to treat periodontitis.

Aim: The objective of the current project was to develop a S3 Level Clinical Practice Guideline (CPG) for the treatment of Stage I–III periodontitis.

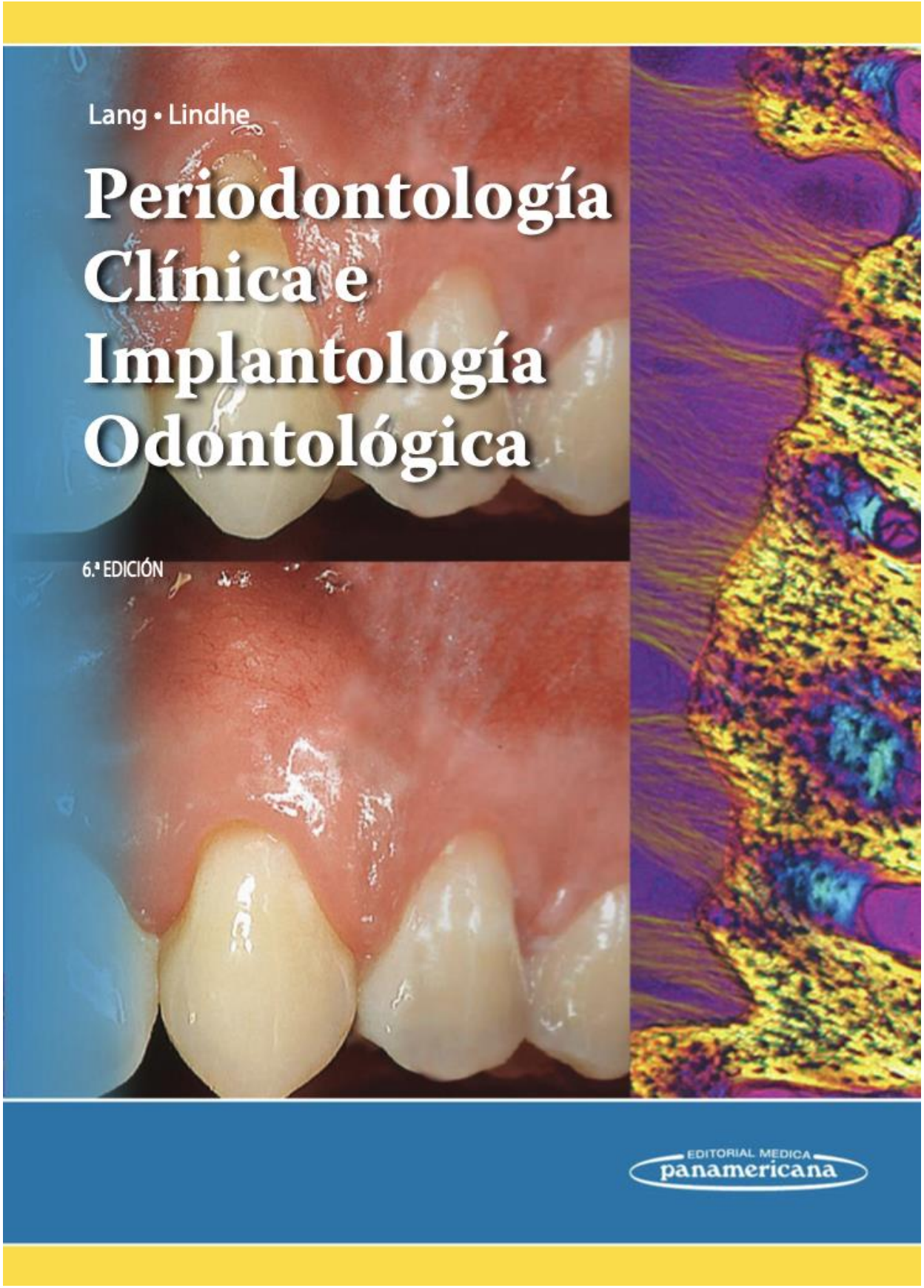
Material and Methods: This S3 CPG was developed under the auspices of the European Federation of Periodontology (EFP), following the methodological guidance of the Association of Scientific Medical Societies in Germany and the Grading of Recommendations Assessment, Development and Evaluation (GRADE). The rigorous and transparent process included synthesis of relevant research in 15 specifically commissioned systematic reviews, evaluation of the quality and strength of evidence, the formulation of specific recommendations and consensus, on those recommendations, by leading experts and a broad base of stakeholders.

Results: The S3 CPG approaches the treatment of periodontitis (stages I, II and III) using a pre-established stepwise approach to therapy that, depending on the disease stage, should be incremental, each including different interventions. Consensus was achieved on recommendations covering different interventions, aimed at (a) behavioural changes, supragingival biofilm, gingival inflammation and risk factor control; (b) supra- and sub-gingival instrumentation, with and without adjunctive therapies; (c) different types of periodontal surgical interventions; and (d) the necessary supportive periodontal care to extend benefits over time.

Conclusion: This S3 guideline informs clinical practice, health systems, policymakers and, indirectly, the public on the available and most effective modalities to treat periodontitis and to maintain a healthy dentition for a lifetime, according to the available evidence at the time of publication.

EFP Workshop Participants and Methodological Consultants are presented in Appendix 1.

(11)


Lang • Lindhe
Periodontología Clínica e Implantología Odontológica
6.ª EDICIÓN
EDITORIAL MEDICA
panamericana

(12)

Periodontology 2000

Periodontology 2000, Vol. 65, 2014, 149–177
Printed in Singapore. All rights reserved

PERIODONTOLOGY 2000

Acute periodontal lesions

David Herrera, Bettina Alonso, Lorenzo de Arriba, Isabel Santa Cruz, Cristina Serrano & Mariano Sanz

Acute lesions in the periodontium, such as abscesses and necrotizing periodontal diseases, are among the few clinical situations in periodontics where patients may seek urgent care, mostly because of the associated pain. In addition, and in contrast to most other periodontal conditions, rapid destruction of periodontal tissues may occur during the course of these lesions, thus stressing the importance of prompt diagnosis and treatment. In spite of this, the available scientific knowledge on these conditions is limited and is based on somewhat outdated literature. This lack of contemporary data makes it rather challenging to devise evidence-based therapeutic guidelines. Hence, an update is imperative, although it must be confined to an evaluation of narrative reviews and expert opinions.

Other gingival and periodontal lesions may also show an acute presentation, including different infectious processes not related to oral bacterial biofilms, mucocutaneous disorders, or traumatic and allergic lesions.

This article provides an overview and updates of existing information on acute conditions affecting the periodontal tissues, including abscesses in the periodontium, necrotizing periodontal diseases and other acute conditions.

Abscesses in the periodontium

Definition of periodontal abscess

Abscesses in the periodontium are odontogenic infections that may be caused by pulp necrosis, periodontal infections, pericoronitis, trauma or surgery (109). Odontogenic or dental abscesses are classified, according to the source of infection, into periapical (dentoalveolar) abscess, periodontal abscess and pericoronal abscess (327).

A periodontal abscess has been defined as a localized purulent infection in the periodontal tissues (210). A more comprehensive definition has also been proposed: 'a lesion with an expressed periodontal breakdown occurring during a limited period of time, and with easily detectable clinical symptoms, including a localized accumulation of pus located within the gingival wall of the periodontal pocket' (130) (Fig. 1).

Classification of periodontal abscesses

Different criteria have been used to classify periodontal abscesses.

Location

Abscesses can be classiffied as gingival or periodontal abscesses (110). A gingival abscess is a localized painful swelling that affects only the marginal and interdental gingiva and is normally associated with subgingivally impacted foreign objects. These conditions may occur in a previously healthy gingiva (7). A periodontal abscess is a localized painful swelling that affects deeper periodontal structures, including deep pockets, furcations and vertical osseous defects, and is usually located beyond the mucogingival line. Histologically, both lesions are identical, but a gingival abscess affects only the marginal soft tissues of previously healthy sites, whilst a periodontal abscess occurs in a periodontal pocket associated with a periodontitis lesion (76).

Course of the lesion

The course of the lesion can be acute and chronic. An acute periodontal abscess usually manifests symptoms such as pain, tenderness, sensitivity to palpation and suppuration upon gentle pressure. A chronic abscess is normally associated with a sinus tract and it is usually asymptomatic, although the patient can experience mild symptoms (250). A localized acute abscess may become a chronic abscess when drainage is established through a sinus or through the

(13)

CHAPTER 10

Necrotizing Periodontal Disease

PALLE HOLMSTRUP AND JYTTE WESTERGAARD

Nomenclature
Prevalence
Clinical characteristics
Diagnosis
Histopathology
Microbiology
Host response and predisposing factors
Treatment

NOMENCLATURE

Necrotizing gingivitis (NG), necrotizing periodontitis (NP) and necrotizing stomatitis (NS) are the most severe inflammatory periodontal disorders caused by plaque bacteria. The necrotizing diseases usually run an acute course and therefore the term acute is often included in the diagnoses. They are rapidly destructive and debilitating, and they appear to represent various stages of the same disease process (Horning & Cohen 1995). A distinction between NG and NP has not always been made in the literature, but parallel to the use of the term gingivitis, NG should be limited to lesions only involving gingival tissue with no loss of periodontal attachment (Riley et al. 1992). Most often, however, the disease results in loss of attachment (MacCarthy & Claffey 1991), and a more correct term in cases with loss of attachment is NP, provided the lesions are confined to the periodontal tissues including gingiva, periodontal ligament and alveolar bone. Further progression to include tissue beyond the mucogingival junction is characteristic of necrotizing stomatitis and distinguishes this disease from NP (Williams et al. 1990).

The necrotizing periodontal diseases have been mentioned under several names, some of which are: " Ulceromembranous gingivitis", "acute necrotizing ulcerative gingivitis" (ANUG) and "Vincent's gingivitis" or "Vincent's gingivostomatitis", "necrotizing gingivostomatitis", and "Trench mouth" (Pickard 1973, Johnson & Engel 1986, Horning & Cohen 1995). Vincent first described the mixed fusospirochetal microbiota of the so-called "Vincent's angina", characterized by necrotic areas in the tonsils (Vincent 1898). A similar mixed microbiota has been isolated from NG lesions, but Vincent's angina and NG usually occur independently of each other, and should be regarded as separate disease entities.

NS has features in common with the far more serious *cancrum oris,* also denoted noma. This is a destructive and necrotizing, frequently mortal, stomatitis in which the same mixed fusospirochetal flora dominates. It occurs almost exclusively in certain developing countries, mostly in children suffering from systemic diseases including malnutrition (Enwonwu 1972, 1985). It has been suggested that cancrum oris always develops from preexisting NG (Emslie 1963) but this connection has not been confirmed (Pindborg et al. 1966, 1967, Sheiham 1966).

In the literature, a distinction between NG, NP and NS is seldom made. However, the reader should be aware of this uncertainty and the consequences of the missing distinction between the three diagnoses in the referred reports. The uncertainty is reflected in the present chapter by the use of the term necrotizing periodontal disease (NPD) as a common denominator for necrotizing gingivitis, necrotizing periodontitis and necrotizing stomatitis.

PREVALENCE

During World War II, up to 14% of the Danish military personnel encountered NPD (Pindborg 1951a). Large

Received: 10 December 2017 | Revised: 12 March 2018 | Accepted: 13 March 2018
DOI: 10.1111/jcpe.12946

2017 WORLD WORKSHOP

WILEY Journal of Clinical Periodontology

Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions

Panos N. Papapanou[1] | Mariano Sanz[2] | Nurcan Buduneli[3] | Thomas Dietrich[4] | Magda Feres[5] | Daniel H. Fine[6] | Thomas F. Flemmig[7] | Raul Garcia[8] | William V. Giannobile[9] | Filippo Graziani[10] | Henry Greenwell[11] | David Herrera[2] | Richard T. Kao[12] | Moritz Kebschull[1,13] | Denis F. Kinane[14] | Keith L. Kirkwood[15] | Thomas Kocher[16] | Kenneth S. Kornman[9] | Purnima S. Kumar[17] | Bruno G. Loos[18] | Eli Machtei[19] | Huanxin Meng[20] | Andrea Mombelli[21] | Ian Needleman[22] | Steven Offenbacher[23] | Gregory J. Seymour[24] | Ricardo Teles[14] | Maurizio S. Tonetti[7]

[1]Columbia University, New York, NY, USA
[2]Universidad Complutense Madrid, Madrid, Spain
[3]Ege University, Izmir, Turkey
[4]University of Birmingham, Birmingham, United Kingdom
[5]Universidade Guarulhos, Guarulhos, Brazil
[6]Rutgers University, Newark, NJ, USA
[7]University of Hong Kong, Hong Kong, SAR China
[8]Boston University, Boston, MA, USA
[9]University of Michigan, Ann Arbor, MI, USA
[10]University of Pisa, Pisa, Italy
[11]University of Louisville, Louisville, KY, USA
[12]Private practice, Cupertino, CA, USA
[13]Bonn University, Bonn, Germany
[14]University of Pennsylvania, Philadelphia, PA, USA
[15]University at Buffalo, Buffalo, NY, USA
[16]Greifswald University, Greifswald, Germany
[17]The Ohio State University, Columbus, OH, USA
[18]Academic Center for Dentistry (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam, The Netherlands
[19]Rambam Health Care Campus & Israel Institute of Technology, Haifa, Israel
[20]Peking University, Beijing, China
[21]University of Geneva, Geneva, Switzerland
[22]University College London, London, United Kingdom
[23]University of North Carolina, Chapel Hill, NC, USA
[24]University of Queensland, Brisbane, Australia

(15)

Received: 11 March 2019 | Accepted: 11 March 2019
DOI: 10.1111/jcpe.13104

CLINICAL INNOVATION REPORT

WILEY Journal of Clinical Periodontology

Implementation of the new classification of periodontal diseases: Decision-making algorithms for clinical practice and education

Maurizio S. Tonetti[1,2] | Mariano Sanz[2,3]

[1]Periodontology, Faculty of Dentistry, Hong Kong University, Hong Kong, Hong Kong SAR, China
[2]European Research Group on Periodontology, Genova, Italy
[3]ETEP Research Group, Faculty of Odontology, University Complutense of Madrid, Madrid, Spain

Correspondence
Maurizio S. Tonetti, Periodontology, Faculty of Dentistry, Prince Philip Dental Hospital, Hong Kong University, Hong Kong, Hong Kong SAR, China.
Email: Tonetti@hku.hk

Funding information
This study was supported by the European Research Group on Periodontology (ERGOPerio) and the University of Hong Kong Periodontal Research Fund.

Abstract

Background: Implementation of the new classification of periodontal diseases requires careful navigation of the new case definitions and organization of the diagnostic process along rationale and easily applicable algorithms. The aim of this report was to describe the rationale for one such approach designed for clinical practice and education.

Methods: The authors developed empiric decision-making algorithms based on the new classification to effectively discriminate between the key periodontal diagnoses of periodontal health, gingivitis and periodontitis.

Results: A stepwise approach is proposed that includes (a) a sensitive screening step able to discriminate periodontal health, gingivitis and suspect periodontitis; (b) a specific confirmation step to provide differential diagnosis between periodontitis and the other conditions characterized by attachment loss; (c) a step to assess the severity and complexity of management of the periodontitis case (staging); and (d) a step to assess the risk profile of the case (grading). Specific decision-making algorithms are described for all steps of the diagnostic process.

Conclusions: The proposed process allows discrimination between the different case definitions of periodontal health and disease. The diagnostic accuracy and cost-effectiveness of the process need to be validated in prospective trials generalizable to operators with different level of expertise, different populations and clinical settings.

KEYWORDS
case definition, diagnosis, gingivitis, periodontal diseases, periodontal health, periodontitis, periodontitis grading, periodontitis staging

1 | INTRODUCTION

The recently introduced classification of periodontal diseases (Caton et al., 2018) aims to identify well-defined clinical entities using clear criteria that are able to link diagnosis with prevention and treatment, thus moving towards precision and individualized dentistry. It defines specific criteria for the following diagnoses: (a) periodontal health (Lang and Bartold, 2018); (b) gingivitis (Trombelli, Farina, Silva, & Tatakis, 2018); (c) reduced but healthy periodontium (successfully treated periodontitis); (d) gingival inflammation in a periodontitis patient (treated periodontitis with persistent inflammation) (Chapple et al., 2018); (e) periodontitis (Papapanou et al., 2018; Tonetti, Greenwell, & Kornman, 2018); (f) periodontitis as a manifestation of systemic diseases (Albandar, Susin, & Hughes, 2018; Jepsen et

(16)

Terapéutica periodontal de mantenimiento

Supportive periodontal therapy

SANZ-SÁNCHEZ I*
BASCONES-MARTÍNEZ A**

Sanz-Sánchez I, Bascones-Martínez A. *Terapéutica periodontal de mantenimiento.* Av Periodon Implantol. 2017; 29, 1: 11-21

RESUMEN

Introducción: El mantenimiento es una fase fundamental de la terapia y prevención de las enfermedades periodontales. Los objetivos de esta revisión son: a) Determinar cuáles son los aspectos de la terapia periodontal de mantenimiento; b) conocer el valor del mantenimiento sobre los resultados a largo plazo del tratamiento periodontal; c) revisar los factores de riesgo del paciente, del diente y de la localización; d) establecer un protocolo de acción ante las distintas situaciones.
Material, métodos y resultados: Para la realización de este trabajo se han analizado 46 artículos científicos. Para la búsqueda se han empleado la base de datos MEDLINE y Cochrane.
Discusión: Los objetivos de la terapia de mantenimiento son prevenir la iniciación y recurrencia de las enfermedades periodontales. Independientemente del tipo de tratamiento que realicemos, los parámetros clínicos no mejoraran si el mantenimiento por parte del profesional no se lleva a cabo. Para establecer los intervalos de las citas y las localizaciones a tratar, será fundamental la valoración de los factores de riesgo asociados al paciente, al diente y a la localización.

PALABRAS CLAVE: Mantenimiento periodontal, terapia periodontal de mantenimiento, riesgo de pérdida de inserción, cirugía periodontal, terapia causal.

SUMMARY

Introduction: Supportive periodontal therapy (SPT) is an essential phase of periodontal disease prevention and therapy. The objectives of this review are: a) to determine the different aspects from SPT; b) to know the value of SPT in long term results after active periodontal therapy; c) to review the patient, the tooth and the site related risk factors; d) to establish clinical protocols for managing the different situations.
Materials, Methods and results: For the preparation of this work, 46 scientific articles have been analyzed the MEDLINE and Cochrane databases have been used to make the search.
Discussion: The objectives of SPT are to prevent the initiation or recurrence of periodontal diseases. Independently of the type of treatment, the clinical outcomes won't improve if we don't perform a professional SPT. To establish the appointment intervals and the sites to be treated, we have to evaluate the risk factors associated to the patient, the tooth and the site.

KEY WORDS: Periodontal maintenance, supportive periodontal therapy, risk of attachment loss, periodontal surgery, cause-related therapy.

Fecha de recepción: 30 de junio de 2009.
Fecha de aceptación: 2 de julio de 2009.

* Licenciado en Odontología. Facultad de Odontología. Universidad Complutense de Madrid. Máster en Ciencias Odontológicas. Facultad de Odontología. Universidad Complutense de Madrid.
** Catedrático en Medicina Oral y Periodoncia. Director del máster de Periodoncia e Implantes de la Facultad de Odontología de la Universidad Complutense de Madrid.

(17)

Received: 25 September 2018 | Revised: 26 February 2019 | Accepted: 29 March 2019
DOI: 10.1111/idh.12399

ORIGINAL ARTICLE

International Journal of Dental Hygiene WILEY

Success of non-surgical periodontal therapy in adult periodontitis patients: A retrospective analysis

G.A. (Fridus) Van der Weijden[1,2] | Gijs J. Dekkers[1] | Dagmar E. Slot[1]

[1]Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

[2]Clinic for Periodontology Utrecht, Utrecht, The Netherlands

Correspondence
G.A. (Fridus) Van der Weijden, Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Gustav Mahlerlaan 3004, 1081 LA Amsterdam, The Netherlands.
Email: ga.vd.weijden@acta.nl

Funding information
This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. The work for this paper was funded by the regular academic appointments of Slot and Van der Weijden at the Academic Centre for Dentistry Amsterdam (ACTA). This paper was prepared as a part of the obligation of the second author to fulfil the requirements of the ACTA bachelor's programme in dentistry. Van der Weijden is the owner of the Clinic for Periodontology, Utrecht.

Abstract

Objective: To evaluate the results of active non-surgical treatment in patients diagnosed with adult periodontitis treated in a specialized clinic for periodontology.

Material & Methods: In total, 1182 patients with adult periodontitis received active non-surgical therapy, which involved professional oral hygiene instruction, scaling and root planing, supragingival polishing and elective systemic antimicrobial medication. The results of this therapy were based on a full-mouth periodontal chart as assessed at the time of evaluation. Successful treatment as periodontal pocket depth (PPD) ≤5 mm was the main outcome parameter with bleeding on pocket probing as secondary outcome. Patient-related factors such as smoking and severity of periodontitis at baseline and site-related factors such as tooth type, furcation involvement and endodontic treatment were analysed. Possible relations with assessed parameters and the success of active periodontal therapy were evaluated.

Results: Overall 39% of the patients reached the successful treatment objective and a mean bleeding on pocket probing tendency of 14%. Treatment success appeared to be dependent on tooth type where the results at single-rooted front teeth (85%) and premolar teeth (78%) were more successful than at molar teeth (47%). Analysis revealed that in 55% of the cases furcation involvement at molars was associated with the absence of success. Endodontic treatment was associated with absence of success in 8%-11% of the cases. Smoking negatively influences successful treatment outcome ($P < 0.001$).

Conclusion: Active non-surgical periodontal therapy in patients with adult periodontitis resulted in approximately one third of the cases in the success endpoint of PPD ≤ 5mm. Sub-analysis showed that the outcome appeared to be dependent on tooth type, furcation involvement, severity of periodontal disease at intake and smoking status.

KEYWORDS
adult periodontitis, bleeding on probing, long-term follow-up, probing pocket depth, risk factors, smoking, supportive periodontal treatment, treatment

(19)

Periodontology 2000, Vol. 25, 2001, 77–88
Printed in Denmark · All rights reserved

PERIODONTOLOGY 2000
ISSN 0906-6713

Nonsurgical periodontal therapy

CONNIE HASTINGS DRISKO

Anti-infective therapy

Successful periodontal therapy is dependent on anti-infective procedures aimed at eliminating pathogenic organisms found in dental plaque associated with the tooth surface and within other niches in the oral cavity (9, 103, 104). Since periodontal disease is a plaque-induced infection and most patients are not skilled in mechanical plaque removal, professional cleaning is almost universally indicated to sustain long-term stability of the periodontium (22, 75). Very few patients can maintain periodontal health over a lifetime without the benefit of regular dental care, which consists primarily of oral hygiene instruction, and nonsurgical anti-infective therapy (69, 121, 122).

Anti-infective therapy includes both mechanical and chemotherapeutic approaches to minimize or eliminate microbial biofilm (bacterial plaque), the primary etiology of gingivitis and periodontitis. Mechanical therapy consists of debridement of the roots by the meticulous use of hand or power-driven scalers to remove plaque, endotoxin, calculus and other plaque-retentive local factors. The term mechanical therapy refers to both supragingival and subgingival scaling as well as root planing. In theory, these procedures are different, but in most clinicians' point of view, the difference between scaling and scaling and root planing is really a matter of degree (17).

The term periodontal debridement was suggested by Smart et al. (102) to describe the light overlapping strokes used for instrumenting the root with a sonic or ultrasonic scaler. However, others have used the term more broadly to describe both hand and power-driven scaling that is a gentle, yet thorough subgingival instrumentation aimed at the removal of toxic substances without overinstrumentation or the intentional removal of cementum. The endpoint of all periodontal debridement is to produce a root that is biologically acceptable for a healthy attachment (13, 14, 28, 52, 100–102, 114).

Chemotherapeutic approaches include topical application of antiseptics (91, 96, 97) or sustained-release local drug delivery agents that are designed to prevent plaque accumulation and to disinfect the root surfaces and adjacent periodontal tissues (27, 43, 54, 105, 106). Systemic approaches encompass the selective use of antibiotics or host modulation of tissue destructive enzymes (19, 42). Once the infection and inflammation are controlled by surgical or nonsurgical methods, periodontal health can be sustained for extended periods of time with daily plaque control by the patient and periodic professional maintenance by the dentist and dental hygienist (51, 55, 66, 77, 88, 89, 94).

This chapter summarizes selected representative studies from an extensive body of literature that addresses the use of nonsurgical therapy to treat periodontal diseases. Comparisons between treatment outcomes following instrumentation with manual or power-driven scalers are discussed as well as the evidence to support the advantages and disadvantages of the adjunctive use of pharmacotherapeutic agents (50) found in toothpastes (20, 23, 35), mouthrinses (31, 39, 45, 49, 62, 71) irrigation solutions/ultrasonic lavage (10, 34, 48, 95), local drug delivery devices (27, 37, 38, 43, 46, 54, 90, 105, 106) and host modulating drugs (19, 42).

Risk factors influencing nonsurgical therapy outcomes

Not all patients respond well to therapy nor are they able to maintain a stable periodontium over extended periods of time following successful periodontal therapy. Factors influencing undesirable therapeutic outcomes usually include poor compliance with oral hygiene regimens and failure to return for regular maintenance care (121, 122). Insufficient debridement may account for some treatment failures or reinfection; however, the presence of systemic conditions or diseases such as diabetes mellitus may also have a significant impact on long-term

Received: 29 August 2019 | Revised: 3 December 2019 | Accepted: 14 December 2019
DOI: 10.1111/jcpe.13245

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Subgingival instrumentation for treatment of periodontitis. A systematic review

Jeanie Suvan[1] | Yago Leira[1] | Federico Manuel Moreno Sancho[1] | Filippo Graziani[2] | Jan Derks[3] | Cristiano Tomasi[3]

[1]Periodontology Unit and Department of Clinical Research, University College London Eastman Dental Institute, London, UK

[2]Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy

[3]Department of Periodontology, Institute of Odontology, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden

***Correspondence**
Cristiano Tomasi, Department of Periodontology, Institute of Odontology, The Sahlgrenska Academy at University of Gothenburg, Box 450, SE 405 30, Gothenburg, Sweden.
Email: cristiano.tomasi@odontologi.gu.se

Abstract

Objectives: To evaluate the efficacy of subgingival instrumentation (PICOS-1), sonic/ultrasonic/hand instruments (PICOS-2) and different subgingival instrumentation delivery protocols (PICOS-3) to treat periodontitis.

Methods: Systematic electronic search (CENTRAL/MEDLINE/EMBASE/SCOPUS/LILACS) to March 2019 was conducted to identify randomized controlled trials (RCT) reporting on subgingival instrumentation. Duplicate screening and data extraction were performed to formulate evidence tables and meta-analysis as appropriate.

Results: As only one RCT addressed the efficacy of subgingival instrumentation compared with supragingival cleaning alone (PICOS-1), baseline and final measures from 9 studies were considered. The weighted pocket depth (PD) reduction was 1.4 mm (95%CI: 1.0–1.7) at 6/8 months, and the proportion of pocket closure was estimated at 74% (95%CI: 64–85). Six RCTs compared hand and sonic/ultrasonic instruments for subgingival instrumentation (PICOS-2). No significant differences were observed between groups by follow-up time point or category of initial PD. Thirteen RCTs evaluated quadrant-wise versus full-mouth approaches (PICOS-3). No significant differences were observed between groups irrespective of time-points or initial PD. Five studies reported patient-reported outcomes, reporting no differences between groups.

Conclusions: Nonsurgical periodontal therapy by mechanical subgingival instrumentation is an efficacious means to achieve infection control in periodontitis patients irrespective of the type of instrument or mode of delivery. Prospero ID: CRD42019124887.

KEYWORDS
nonsurgical treatment, periodontal disease, pocket closure, scaling and root planning, subgingival instrumentation

1 | INTRODUCTION

Periodontitis is a chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the tooth-supporting apparatus which may result in tooth loss. In the 2017 World Workshop on the Classification of Periodontal and Peri-implant Diseases and Conditions, the lack of available evidence supporting the distinction between aggressive and chronic forms of periodontitis was highlighted. However, it was recognized that a substantial variation in terms of extent and

J Clin Periodontol 2008; 35: 31–36 doi: 10.1111/j.1600-051X.2007.01169.x

Journal of Clinical Periodontology

Penetration depths with an ultrasonic mini insert compared with a conventional curette in patients with periodontitis and in periodontal maintenance

Dick S. Barendregt, Ubele van der Velden, Mark F. Timmerman and Fridus van der Weijden

Department of Periodontology, Academic Centre for Dentistry, Amsterdam, The Netherlands

Barendregt DS, van der Velden U, Timmerman MF, van der Weijden F. Penetration depths with an ultrasonic mini insert compared with a conventional curette in patients with periodontitis and in periodontal maintenance. J Clin Periodontol 2008; 35: 31–36. doi: 10.1111/j.1600-051X.2007.01169.x.

Abstract

Aim: The aim of the study was to test whether a slim Ultrasonic Tip reaches a more apical position when penetrating a periodontal pocket compared with the working blade of a conventional Gracey Curette in both untreated periodontitis and periodontal maintenance patients.

Material and Methods: Twenty untreated and 15 periodontal maintenance patients were selected based on the presence of at least one site a pocket of $\geqslant 5$ mm in each quadrant. Recordings were made at the four approximal sites of four experimental teeth in each patient. First, the probing pocket depth was measured with the Jonker Probe®. Second in randomized order, the penetration depth was assessed with an EMS PS Ultrasonic Tip and a Gracey Curette.

Results: In the periodontitis group, the Ultrasonic Tip penetrated significantly deeper than the Jonker Probe and the Gracey Curette. In the maintenance group, no differences were observed. Comparing the penetration of the instruments between groups, as related to the Jonker Probe measurements, only in the periodontitis group did the Ultrasonic Tip reach a significantly more apical level.

Conclusion: The results of the present study show that in untreated periodontitis patients, the Ultrasonic Tip penetrated the pocket deeper than the pressure-controlled probe and the Gracey Curette.

Key words: maintenance patients; periodontitis; pocket penetration; probing pocket depth; subgingival debridement

Accepted for publication 22 October 2007

Periodontal root debridement is a vital component of surgical and nonsurgical therapy. The essential characteristic in the treatment of periodontitis is mechanical removal of subgingival bacterial deposits and calculus (Waerhaug 1978, Badersten et al. 1981, Lindhe et al. 1984). Traditionally, this has been performed with manual instruments. Badersten et al. (1984) and Loos et al. (1987) demonstrated in their clinical studies that root debridement with hand instruments, ultrasonic and sonic scaler devices resulted in comparable clinical outcomes. In a review paper, Drisko et al. (2000) concluded that ultrasonic and sonic scalers can achieve results similar a to hand instruments for removing plaque, calculus and endotoxin. They also stated that due to the instrument width of the ultrasonic scalers, furcations may be more easily accessible as compared with hand instruments.

Adequate access for subgingival debridement becomes more difficult as the probing depth increases (Waerhaug 1978, Caffesse et al. 1986, Dragoo 1992, Rateitschak-Pluss et al. 1992).

Conflict of interest and source of funding statement

The authors declare that they have no conflict of interests.
The study was self-funded by the authors and Academic Centre for Dentistry, Amsterdam, the Netherlands.

Clin Oral Invest (2016) 20:1193–1201
DOI 10.1007/s00784-015-1605-2

ORIGINAL ARTICLE

Removal of simulated biofilm: a preclinical ergonomic comparison of instruments and operators

Christian Graetz[1] · Anna Plaumann[1] · Sebastian Rauschenbach[1] · Jule Bielfeldt[1] · Christof E. Dörfer[1] · Falk Schwendicke[2]

Received: 16 December 2014 /Accepted: 21 September 2015 /Published online: 29 September 2015

Abstract

Background Periodontal scaling might cause musculoskeletal disorders, and scaling instruments might not only have different effectiveness and efficiency but also differ in their ergonomic properties. The present study assessed ergonomic working patterns of experienced (EO) and less experienced operators (LO) when using hand and powered devices for periodontal scaling and root planning.

Methods In an experimental study using periodontally affected manikins, sonic (AIR), ultrasonic (TIG) and hand instruments (GRA) were used by 11 operators (7 EO/4 LO) during simulated supportive periodontal therapy. Using an electronic motion monitoring system, we objectively assessed the working frequency and positioning of hand, neck and head. Operators' subjective evaluation of the instruments was recorded using a questionnaire.

Results Hand instruments were used with the lowest frequency ($2.57 \pm 1.08\ s^{-1}$) but greatest wrist deviation ($59.57 \pm 53.94°$). EO used instruments more specifically than LO, and generally worked more ergonomically, with less inclination of head and neck in both the frontal and sagittal planes, especially when using hand instruments. All groups found hand instruments more tiring and difficult to use than powered instruments.

Conclusion Regardless of operators' experience, powered instruments were used more ergonomically and were subjectively preferred compared to hand instruments.

Clinical relevance The use of hand instruments has potential ergonomic disadvantages. However, with increasing experience, operators are able to recognise and mitigate possible risks.

Keywords Dental scaling · Self-assessment · Ergonomics · Dental plaque · Musculoskeletal diseases

Electronic supplementary material The online version of this article (doi:10.1007/s00784-015-1605-2) contains supplementary material, which is available to authorized users.

✉ Christian Graetz
graetz@konspar.uni-kiel.de

[1] Clinic for Conservative Dentistry and Periodontology, School of Dental Medicine, Christian-Albrechts-University of Kiel, Kiel, Germany

[2] Department of Operative and Preventive Dentistry, Charité–University of Berlin, Berlin, Germany

Introduction

Whilst being technically challenging and time demanding, an effective root surface instrumentation during supportive periodontal therapy (SPT) with hand instruments allows excellent direct tactile control and assessment of the treatment and its results [1, 2]. In contrast, power-driven instruments, which are rather blunt and use acceleration of the vibrating tip to disrupt the plaque [3], seem easier to use which might explain why practitioners increasingly prefer power-driven over hand instruments [4, 5]. Further reasons for this preference could include the higher efficiency and possibly improved ergonomics of power-driven scalers. Additionally, power-driven instruments might reduce root surface damages in comparison with hand instruments, further increasing their acceptability [4, 6–9].

Currently, there is limited knowledge if and how often regular periodontal scaling induces musculoskeletal disorder symptoms [10, 11]. The prevalence of musculoskeletal disorder symptoms as well as carpal tunnel syndromes among dental hygienists is discussed controversially [12–14], with a high

J Clin Periodontol 2002; 29(Suppl. 3): 72–81
Printed in Denmark.

Journal of Clinical Periodontology
ISSN 1600-2865

Review article

A systematic review of efficacy of machine-driven and manual subgingival debridement in the treatment of chronic periodontitis

J. Tunkel[1], A. Heinecke[2] and T. F. Flemmig[1]
[1]Clinic of Periodontology and [2]Department of Medical Informatics and Biomathematics, University of Muenster, Germany

Tunkel J, Heinecke A, Flemmig T.F: A systematic review of efficacy of machine-driven and manual subgingival debridement in the treatment of chronic periodontitis. J Clin Periodontol 2002; 29(Suppl. 3): 72–81. © Blackwell Munksgaard, 2002.

Abstract
Objectives: The purpose of this systematic review was to determine the efficacy of machine-driven compared with manual subgingival debridement in the treatment of periodontitis.
Background: Mechanical debridement of the periodontal pocket plays a pivotal role in the treatment of periodontitis.
Methods: A literature search for controlled clinical trials with at least 6 months' follow-up comparing machine-driven instruments with hand instruments for the treatment of chronic periodontitis was performed up to April 2001. Screening of titles and abstracts as well as data extraction was conducted independently by two reviewers (J.T. & T.F.F.). As primary outcome variable, the prevention of tooth loss was used; secondary outcome variables were the prevention of disease progression, the resolution of anatomical defects and the resolution of gingival inflammation. Efficiency was assessed by mean time needed to treat one tooth.
Results: From a total of 419 abstracts, 27 articles were included for the review. The weighted kappa score for agreement between the two reviewers was 0.77, 95% CI: 0.65–0.89, indicating substantial agreement. No study reported on the selected primary outcome variables. Using clinical attachment gain, probing pocket depth reduction or bleeding on probing reduction as outcome variables, there appeared to be no differences between ultrasonic/sonic and manual debridement. No major differences in the frequency or severity of adverse effects were found. However no meta-analysis could be performed on any of the previously mentioned parameters. Ultrasonic/sonic debridement was found to take significantly less time, i.e. 36.6%, than debridement using hand instruments ($P = 0.0002$, 95% CI of the standardized effect estimate: 0.39–1.37, heterogeneity $P = 0.77$).
Conclusions: With respect to clinical outcome measures, the available data do not indicate a difference between ultrasonic/sonic and manual debridement in the treatment of chronic periodontitis for single-rooted teeth; however, the evidence for this is not very strong. In addition, ultrasonic/sonic subgingival debridement requires less time than hand instrumentation. Further research is needed to assess the efficacy of machine-driven debridement on multirooted teeth and clinical outcome variables having tangible benefit to the patients should be used.

Key words: dental-scaling; meta-analysis; periodontitis-therapy; sonication; subgingival curettage; systematic review; ultrasonics

(24)

J Clin Periodontol 2015; 42 (Suppl. 16): S77–S91 doi: 10.1111/jcpe.12359

Journal of Clinical Periodontology

Efficacy of homecare regimens for mechanical plaque removal in managing gingivitis a meta review

Fridus A. Van der Weijden[1,2] and Dagmar E. Slot[1]

[1]Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), Amsterdam, The Netherlands; [2]Clinic for Periodontology Utrecht, Utrecht, The Netherlands

Van der Weijden FA, Slot DE. Efficacy of homecare regimens for mechanical plaque removal in managing gingivitis -a meta review- J Clin Periodontol 2015; 42 (Suppl. 16): S77–S91. doi: 10.1111/jcpe.12359

Abstract

Focused question: Based on evidence as presented in systematic reviews what is the efficacy and safety of available homecare toothbrush regimens for mechanical plaque removal on plaque and gingivitis in adults?

Material & Methods: Three Internet sources were used (up to and including August 2014) to search for appropriate papers that satisfied the study purpose. Plaque scores and gingivitis scores were considered to be the primary parameter of interest. Safety was considered an important facet in relation to efficacy. Data and conclusions as presented in the selected papers were extracted. The potential risk of bias was estimated and the emerging evidence was graded.

Results: Independent screening of 176 unique reviews resulted in 10 published and eligible systematic reviews. They were categorized into one review evaluating the effect of an oral hygiene instruction with a toothbrush on plaque and gingivitis scores, five evaluating the efficacy of manual and power toothbrushes and three reviews evaluating toothbrush safety and one evaluating toothbrush contamination.

Conclusion: Tooth brushing is effective in reducing levels of dental plaque. With respect to gingivitis power toothbrushes have a benefit over manual toothbrushes. The greatest body of evidence was available for oscillating–rotating brushes. Tooth brushing generally can be considered safe for the teeth and their investing tissues.

Key words: dental plaque; gingivitis; manual toothbrush; meta-review; power toothbrush; safety; systematic review; tooth brushing; toothbrush contamination

Accepted for publication 20 December 2014

"Because we have become accustomed to the scientific terms applied to teeth and gums, we lose sight of the fact that teeth are bones protruding through soft tissues where conditions are extremely unfavourable to maintain health" (Smith 1940). With this introductory quote from 75 years ago, the need for oral self-care is clearly indicated. In fact, it makes the reader wonder how a healthy dentition can be maintained throughout

Conflict of interest and source of funding

The authors declare that they have no conflict of interest. For this study, no funding was accepted except support from the institution. The initiative for this work came from the European Federation of Periodontology.
Ethical approval was not required.
Van der Weijden, Slot and their research team at ACTA have formerly received either external advisor fees, lecturer fees or research grants from toothbrush manufacturers. Among these were Braun AG, Colgate, Dentaid, GABA, Lactona, Oral-B, Philips, Procter & Gamble, Sara Lee, Sunstar and Unilever.

J Clin Periodontol 2015; 42 (Suppl. 16): S221–S236 doi: 10.1111/jcpe.12339

Journal of Clinical Periodontology

Effect of professional mechanical plaque removal performed on a long-term, routine basis in the secondary prevention of periodontitis: a systematic review

Leonardo Trombelli[1,2], Giovanni Franceschetti[1] and Roberto Farina[1,2]

[1]Research Centre for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy; [2]Operative Unit of Dentistry, University-Hospital of Ferrara, Ferrara, Italy

Trombelli L, Franceschetti G, Farina R. Effect of professional mechanical plaque removal performed on a long-term, routine basis in the secondary prevention of periodontitis: a systematic review. J Clin Periodontol 2015; 42 (Suppl. 16): S221–S236. doi: 10.1111/jcpe.12339.

Abstract

Aims: To systematically review the evidence evaluating the efficacy of long-term, routine, professional mechanical plaque removal (PMPR) in the prevention of periodontitis progression.

Methods: A literature search was conducted to identify prospective studies evaluating the effect of PMPR in periodontitis patients undergoing active periodontal therapy and enrolled in a maintenance programme including PMPR for at least 3 years.

Results: No RCTs evaluating the efficacy of the intervention when compared with no treatment during maintenance were found. Nineteen prospective studies assessing the effect of PMPR as part of the supportive therapy were included. In general, studies reported no to low incidence of tooth loss during follow-up. The weighted mean yearly rate of tooth loss was 0.15 ± 0.14 and 0.09 ± 0.08 for follow-up of 5 years or 12–14 years, respectively, with no significant differences between groups. Mean clinical attachment loss was <1 mm at follow-up ranging from 5 to 12 years.

Conclusions: Supportive therapy, which encompasses PMPR, may limit the incidence and yearly rate of tooth loss as well as the loss in clinical attachment in patients treated for periodontitis. However, whether and to what extent the intervention may impact on long-term periodontal parameters still needs to be assessed.

Key words: dental plaque; dental scaling; periodontitis; periodontal attachment loss; tooth loss

Accepted for publication 25 November 2014

Conflict of interest and source of funding statement

The authors declare that they have no conflict of interest.
The study was entirely supported by the Research Centre for the Study of Periodontal and Peri-implant Diseases, University of Ferrara, Italy.
For the European Federation of Periodontology, Ferrara 25/11/14.

The removal of the dental biofilm and calcified deposits from the tooth surface (here identified under the term "plaque removal") contrasts the evolution of plaque-induced gingival inflammation from a sub-clinical to a clinical state and abates the severity of established gingivitis (van der Weijden & Hioe 2005). When plaque removal is performed at periodontally compromised sites, the clinical benefit may include the elimination/reduction in periodontal inflammation and suppuration, the gain in clinical attachment and the reduction in probing pocket depth (van der Weijden & Timmerman 2002). At present, plaque removal is currently considered as the essential procedure for the prevention and

Periodontology 2000, Vol. 75, 2017, 152–188
Printed in Singapore. All rights reserved

PERIODONTOLOGY 2000

Nonsurgical and surgical treatment of periodontitis: how many options for one disease?

Filippo Graziani, Dimitra Karapetsa, Bettina Alonso & David Herrera

Periodontal disease is an infectious disease characterized by inflammation of the tooth-supportive tissues, which can lead to destruction of the periodontal ligament and alveolar bone and possibly also to tooth loss (261). Periodontal health is a component of overall health and is therefore a fundamental human right (17). Treatment of periodontitis aims to prevent further disease progression, to minimize symptoms and perception of the disease, possibly to restore lost tissues and to support patients in maintaining a healthy periodontium. Periodontal treatment utilizes a plethora of therapeutic interventions to achieve these goals, including behavioral-change techniques, such as: individually tailored oral-hygiene instructions (138, 140); smoking-cessation support (39, 237); dietary intervention (116); subgingival instrumentation to remove plaque and calculus (157); local and systemic pharmacotherapy (42, 133, 275); and various types of surgery (53, 54, 149, 232, 280, 284, 318). Management of chronic periodontal disease requires a combination of therapeutic modalities and a lifelong commitment to periodontal self-care.

Supragingival biofilm control

May periodontitis be treated with supragingival biofilm control alone?

Supragingival plaque control relies on self-performed oral-hygiene measures and professional removal of plaque/calculus/plaque-retaining factors. Owing to a high rate of dental plaque formation, long-term plaque control depends heavily on self-performed oral hygiene. Accumulation of high levels of plaque is associated with lower healing capability, if not worsening periodontal conditions, and precludes a successful outcome with nonsurgical periodontal treatment (71), conventional surgery (204, 266) and regenerative surgery (82, 119, 246). Thus, self-performed oral hygiene represents the keystone of the treatment of periodontal diseases, but one might wonder if daily disruption of the supragingival biofilm, alone, is sufficient to treat periodontal disease. Studies have assessed the effect of oral-hygiene regimens alone on both periodontal clinical parameters (38, 93, 181, 227, 322) and the subgingival microbiota (181). In a systematic review of patients with chronic periodontitis (311), oral hygiene alone was less effective than subgingival debridement combined with supragingival plaque removal, as measured by bleeding on probing, probing pocket depth and clinical attachment level (340). In pockets with initial depths of ≥ 5 mm, supragingival plaque control alone produced a decrease in pocket depth of 0.59 mm and a clinical attachment gain of 0.37 mm, whereas scaling and root planing plus oral hygiene yielded a decrease in pocket depth of 1.18 mm and an attachment gain of 0.64 mm (93, 227). Moreover, subjects affected by severe periodontitis showed a significant reduction in all microbial parameters 1 week following subgingival instrumentation but not in the subgingival microbiota after 12 weeks of oral-hygiene instructions alone (181). A 3-year study of subjects receiving solely supragingival plaque control showed further loss of attachment or an unchanged frequency of pockets deeper than 6 mm (8% at baseline and 5.3% at the 36-months examination), whereas patients who also received subgingival debridement experienced a significant reduction of deep pockets (11% at baseline vs. 0.3% at 36 months) (322).

May periodontitis be treated without supragingival biofilm control?

A question that emerges quite spontaneously in the treatment of periodontitis concerns the effectiveness

(27)

Accepted: 18 June 2017
DOI: 10.1111/jcpe.12765

EPIDEMIOLOGY (COHORT STUDY OR CASE-CONTROL STUDY)

WILEY Journal of Clinical Periodontology

Association of flossing/inter-dental cleaning and periodontitis in adults

M. Soledad Cepeda[1] | Rachel Weinstein[1] | Clair Blacketer[1] | Michael C. Lynch[2]

[1]Department of Epidemiology, Janssen Research & Development, LLC, Titusville, NJ, USA

[2]Global Scientific Engagement – Oral Care, Johnson & Johnson Consumer Inc., Skillman, NJ, USA

Correspondence
M. Soledad Cepeda, Senior Director Epidemiology, Janssen Research & Development, Titusville, NJ, USA.
Email: scepeda@its.jnj.com

Funding information
Johnson & Johnson Consumer Inc., is the maker of LISTERINE® floss. All authors are Johnson & Johnson employees and are shareholders of Johnson & Johnson.

Abstract

Aim: Assess the association of flossing with periodontitis.

Materials and Methods: This was a cross-sectional study using the National Health and Nutrition Examination Survey (NHANES) years 2011-2014. We used three categories of flossing: 0–1, 2–4 and ≥5 days in the past week and the CDC definition of periodontitis. We calculated odds ratios controlling for age, gender, smoking, drinking, income and dentist visits.

Results: A total of 6939 adult subjects were included, 35% flossed ≤1 time a week, and 40% had periodontitis. After adjustment, the odds of periodontitis were 17% lower for subjects who flossed >1 time a week than for subjects who flossed less often (odds ratio=0.83, 95% CI 0.72–0.97). A dose response was not observed. Men were twice as likely as women to have periodontitis. Younger subjects, non-smokers and subjects with the highest incomes had lower odds of having periodontitis.

Conclusions: Flossing was associated with a modestly lower prevalence of periodontitis. Older age, being male, smoking, low income and less frequent dental visits were associated with a higher prevalence of periodontitis. Flossing 2–4 days a week could be as beneficial as flossing more frequently. This is a cross-sectional study so a causal relation between flossing and periodontitis cannot be established.

KEYWORDS
cross-sectional study, flossing, inter-dental cleaning, national health and nutrition examination survey, periodontitis

1 | BACKGROUND

Good oral hygiene practices are widely considered important to maintaining good oral health, and flossing has long been considered an indispensable part of an effective oral hygiene routine. Dental plaque is a bacterial biofilm which causes chronic gingivitis and periodontitis (Hasan & Palmer, 2014), and flossing removes plaque or controls its accumulation (Chapple et al., 2015). Periodontitis is a common chronic condition characterized by gingival inflammation of the supporting tissues around the teeth (Savage, Eaton, Moles, & Needleman, 2009). It affects approximately 45% of adults in the USA (Eke et al., 2015), and it is a major cause of tooth loss (Chapple et al., 2015).

Even though flossing has been considered to be important to oral health, systematic reviews and meta-analyses of randomized controlled trials found that flossing is associated with only a small reduction in plaque and gingivitis (Berchier, Slot, Haps, & Van der Weijden, 2008; Salzer, Slot, Van der Weijden, & Dorfer, 2015). The individual studies in the meta-analyses were small, with a total number of subjects in the flossing groups of fewer than 600 (Sambunjak et al., 2011).

The National Health and Nutrition Examination Survey (NHANES) is a national research programme that collects health information

Periodontology 2000

Periodontology 2000, Vol. 55, 2011, 104–123
Printed in Singapore. All rights reserved

PERIODONTOLOGY 2000

Oral hygiene in the prevention of periodontal diseases: the evidence

FRIDUS VAN DER WEIJDEN & DAGMAR ELSE SLOT

There is increasing public awareness of the value of personal oral hygiene. People brush their teeth for a number of reasons: to feel fresh and confident, to have a nice smile, and to avoid bad breath and disease. Oral cleanliness is important for the preservation of oral health as it removes microbial plaque, preventing it from accumulating on teeth and gingivae (33). Maintenance of effective plaque control is the cornerstone of any attempt to prevent and control periodontal disease. Supragingival plaque is exposed to saliva and the natural self-cleansing mechanisms that exist in the oral cavity. However, although such mechanisms may eliminate food debris, they do not adequately remove dental plaque. Therefore, regular personal oral hygiene is required for proper elimination of supragingival plaque (132). The most widespread means of actively removing plaque at home is toothbrushing. There is substantial evidence showing that toothbrushing and other mechanical cleansing procedures can reliably control plaque, provided that cleaning is sufficiently thorough and performed at appropriate intervals. Evidence from large cohort studies has demonstrated that high standards of oral hygiene will ensure the stability of periodontal tissue support (9, 64).

Almost 50 years of experimental research and clinical trials in various geographical and social settings have confirmed that effective removal of dental plaque is essential for dental and periodontal health (84). Oral hygiene acts as a non-specific suppressor of plaque mass. This therapeutic approach is based on the rationale that any decrease in plaque mass benefits the inflamed tissues adjacent to bacterial deposits. Diminishing plaque mass through good oral hygiene will reduce the injurious load on these tissues. The assumption that gingivitis is the precursor of periodontitis and that maintenance of healthy gingivae will prevent periodontitis is the basis on which primary prevention of gingivitis is founded. Consequently, preventing gingivitis could have a major impact on periodontal care expenditure (13). Primary prevention of periodontal disease includes educational interventions for periodontal disease and related risk factors, as well as regular, self-performed plaque removal and professional mechanical removal of plaque and calculus. As such, optimal oral hygiene requires appropriate patient motivation, adequate tools and professional oral hygiene instruction.

Oral hygiene instruction

Twice daily brushing with fluoride toothpaste is now an integral part of most people's daily hygiene routine in Western societies. However, it appears that most patients are unable to achieve total plaque control at each cleaning. A systematic review (132) was initiated to assess the effect of mechanical plaque control. The review was refined to address the effect of manual toothbrushing on plaque and gingivitis parameters. The authors systematically searched for papers that investigated the effect of mechanical oral hygiene with respect to gingivitis and plaque control in subjects with gingivitis in studies of at least 6 months duration.

The US National Library of Medicine database (MEDLINE-PubMed) was used to search for appropriate papers for review. The database was searched up to and including September 2004. The search strategy produced 3,223 citations, 33 of which were identified as eligible for inclusion in this review. The 33 studies were randomized, controlled clinical studies involving adults (≥18 years old) with plaque and gingivitis. Table 1 shows the results of the

ORIGINAL RESEARCH
Periodontics

Supragingival treatment as an aid to reduce subgingival needs: a 450-day investigation

Sabrina Carvalho GOMES[(a)]
Rachel ROMAGNA[(b)]
Vanessa ROSSI[(b)]
Paula Chiattone CORVELLO[(b)]
Patrícia Daniela Melchiors ANGST[(a)]

[(a)]Department of Periodontology, Dental School, Universidade Federal do Rio Grande do Sul - UFRGS, Porto Alegre, RS, Brazil.

[(b)]Dental School, Universidade Luterana do Brasil - ULBRA, Canoas, RS, Brazil.

Declaration of Interests: The authors certify that they have no commercial or associative interest that represents a conflict of interest in connection with the manuscript.

Corresponding Author:
Sabrina Carvalho Gomes
E-mail: sabrinagomes.perio@gmail.com

http://dx.doi.org/10.1590/S1806-83242014.50000004
Epub Jan 24, 2014

Submitted: Dec 03, 2012
Accepted for publication: Oct 25, 2013
Last revision: Nov 25, 2013

Abstract: This study investigated the clinical effects of using a supragingival biofilm control regimen (SUPRA) as a step prior to scaling and root planing (SRP). A split-mouth clinical trial was performed in which 25 subjects with periodontitis (47.2 ± 6.5 years) underwent treatment (days 0–60) and monitoring (days 90–450) phases. At Day 0 (baseline) treatments were randomly assigned per quadrant: SUPRA, SRP and S30SRP (SUPRA 30 days before SRP). The full-mouth visible plaque index (VPI), gingival bleeding index (GBI), periodontal probing depth (PPD), bleeding on probing (BOP), and clinical attachment loss (CAL) were examined on days 0, 30, 60, 90, 120, 270, and 450. Baseline data were similar among all groups. From days 0 to 60, the groups showed similar significant decreases in VPI and GBI. Reductions in PPD for the SRP (3.39 ± 0.17 to 2.42 ± 0.16 mm) and S30SRP (3.31 ± 0.11 to 2.40 ± 0.07 mm) groups were greater ($p < 0.05$) than those for the SUPRA group. This pattern was also observed for BOP. Attachment gain was similar and greater for the SRP (3.34 ± 0.28 to 2.58 ± 0.26 mm) and S30SRP (3.25 ± 0.21 to 2.54 ± 0.19 mm) groups compared to the SUPRA group. Results were maintained from day 90 forward. Overall, the S30SRP treatment reduced the subgingival treatment needs in 48.16%. Performance of a SUPRA step before SRP decreased subgingival treatment needs and maintained the periodontal stability over time.

Keywords: Clinical Trial; Dental Scaling; Root Planing.

Introduction

Subgingival biofilm control is a *sine qua non* condition for successful periodontal treatment.[1,2] However, supragingival biofilm control has been strongly associated with the long-term maintenance of subgingival treatment outcomes.[3,4] Some authors have noted the importance of the supragingival condition in modulating the subgingival area.[5,6] However, the exact mechanisms underlying this relationship are not completely understood.

Therapies focused solely on supragingival control[7,8] have been demonstrated to significantly reduce subgingival inflammatory markers, such as bleeding on probing (BOP) and periodontal probing depth (PPD). Use of a supragingival biofilm control regimen (SUPRA) reduced the PPD by an average of 2.4 mm in sites with 6.6 mm of PPD initially.[7] This reduction is somewhat comparable or even greater than those achieved by sub-

J Clin Periodontol 2000; 27: 637–647
Printed in Denmark . All rights reserved

Journal of Clinical Periodontology
ISSN 0303-6979

The effect of repeated professional supragingival plaque removal on the composition of the supra- and subgingival microbiota

Laurie Ann Ximénez-Fyvie, Anne D. Haffajee, Sovanda Som, Maureen Thompson, Gay Torresyap and Sigmund S. Socransky
Department of Periodontology, The Forsyth Institute, Boston, MA, USA

Ximénez-Fyvie LA, Haffajee AD, Som S, Thompson M, Torresyap G, Socransky SS. The effect of repeated professional supragingival plaque removal on the composition of the supra- and subgingival microbiota. J Clin Periodontol 2000; 27: 637–647. © Munksgaard, 2000.

Abstract
Background, aims: The purpose of the present investigation was to determine the effect of weekly professionally administered supragingival plaque removal on the composition of the supra and subgingival microbiota.
Methods: 18 adult subjects with periodontitis who had been treated and were in a maintenance phase of therapy were clinically and microbiologically monitored at baseline, 3, 6 and 12 months. After the baseline visit, the subjects received scaling and root planing followed by professional supragingival plaque removal every week for 3 months. Clinical measures of plaque accumulation, bleeding on probing (BOP), gingival redness, suppuration, pocket depth and attachment level were made at 6 sites per tooth at each visit. Separate supra (N=1804) and subgingival (N=1804) plaque samples were taken from the mesial aspect of all teeth excluding third molars in each subject at each time point and evaluated for their content of 40 bacterial taxa using checkerboard DNA-DNA hybridization. Significance of changes in mean counts, prevalence and proportions of bacterial species over time in both supra and subgingival samples were determined using the Quade test and adjusted for multiple comparisons.
Results: Mean % of sites exhibiting plaque, gingival redness and BOP were significantly reduced during the course of the study. Significant decreases in mean counts were observed in both supra and subgingival samples. Mean total DNA probe counts ($\times 10^5$, $\pm$SEM) at baseline, 3, 6 and 12 months were: 133±19, 95±25, 66±6, 41±6 ($p<0.001$) for supragingival samples and 105±22, 40±10, 19±4, 13±3 ($p<0.001$) for subgingival samples. Mean counts of 22 of 40 and 34 of 40 species tested were significantly reduced in the supra and subgingival samples respectively over the monitoring period. For example, mean counts of *Porphyromonas gingivalis* $\times 10^5$ at baseline, 3, 6 and 12 months in the subgingival plaque samples were 2.0±0.4, 0.5±0.2, 0.6±0.3, 0.3±0.1 ($p<0.001$); *Bacteroides forsythus* 2.0±0.6, 0.4±0.1, 0.4±0.2, 0.1±0.2 ($p<0.001$); *Treponema denticola* 3.4±1.1, 0.8±0.3, 0.4±0.2, 0.3±0.3 ($p<0.01$). Similar reductions were seen in supragingival plaque samples. While counts were markedly reduced by professional plaque removal, the proportion and prevalence of the 40 test species were marginally affected.
Conclusions: Weekly professional supragingival plaque removal profoundly diminished counts of both supra- and subgingival species creating a microbial profile comparable to that observed in periodontal health. This profile was maintained at the final monitoring visit, 9 months after completion of therapy.

Key words: microbiology; periodontal health; periodontal disease; supragingival plaque; subgingival plaque; periodontal pathogens; bacteria; DNA probes; treatment

Accepted for publication 15 October 1999

(31)

J Periodontol 2013;84(4 Suppl.):S164-S169
doi:10.1902/jop.2013.1340016

Periodontitis and adverse pregnancy outcomes: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases

Mariano Sanz[1], Kenneth Kornman[2] and on behalf of working group 3 of the joint EFP/AAP workshop*
[1]University Complutense of Madrid, Spain;
[2]Interleukin Genetics, Waltham, MA, USA

Sanz M, Kornman K, and on behalf of working group 3 of the joint EFP/AAP workshop. Periodontitis and adverse pregnancy outcomes: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases.

Abstract
Background: Pregnancy sometimes has adverse outcomes including low birthweight (<2500 g), pre-term birth (<37 weeks), growth restriction, pre-eclampsia, miscarriage and/or stillbirth. Maternal periodontitis directly and/or indirectly have potential to influence the health of the foetal–maternal unit.
Aims: To assess the epidemiological evidence for the impact of periodontal disease on adverse pregnancy outcomes and to identify potential underpinning mechanisms.
Epidemiology: Low birthweight, pre-term birth and pre-eclampsia have been associated with maternal periodontitis exposure. However, the strength of the observed associations is modest and seems to vary according to the population studied, the means of periodontal assessment and the periodontal disease classification employed.
Biological mechanisms: Two major pathways have been identified, One direct, in which oral microorganisms and/or their components reach the foetal–placental unit and one indirect, in which Inflammatory mediators circulate and impact the foetal–placental unit.
Interventions: Although periodontal therapy has been shown to be safe and leads to improved periodontal conditions in pregnant women, case-related periodontal therapy, with or without systemic antibiotics does not reduce overall rates of pre-term birth and low birthweight.
Guidelines: Given the current evidence, various treatment strategies could be evaluated that consider specific target populations, as well as timing and intensity of treatment.

Key words: adverse pregnancy outcomes; complications; intervention; low birthweight; mechanisms; periodontal disease; periodontitis; pre-eclampsia; pre-term birth; still birth

Accepted for publication 14 November 2012

The proceedings of the workshop were jointly and simultaneously published in the Journal of Clinical Periodontology and Journal of Periodontology.

Conflict of interest and source of funding statement

Group participants declare no conflict of interest. The workshop was funded by an unrestricted educational grant from Colgate-Palmolive to the European Federation of Periodontology and the American Academy of Periodontology.

*Working group participants: Mariano Sanz, Spain; Kenneth Kornman, USA; Mark Ide, UK; Anders Gustafsson, Sweden; Phoebus Madianos, Greece; Panos Papapanou, USA; Steve Offenbacher, USA; Bryan Michalowicz, USA; Lior Shapira, Israel; Leo Trombelli, Italy; Gernot Wimmer, Austria; Bjorn Klinge, Sweden; Tellervo Tervonen, Finland; Michael Reddy, USA; Ricardo Teles, USA; James Katancik, USA; Michael Rethman, USA; Yiping Han, USA; Laurie McCauley, USA; Manuel Voegtli, Switzerland.

(32)

Received: 16 July 2019 | Revised: 13 December 2019 | Accepted: 14 December 2019
DOI: 10.1111/jcpe.13234

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Promoting behavioural changes to improve oral hygiene in patients with periodontal diseases: A systematic review

Maria Clotilde Carra[1,2,3] | Laurent Detzen[1,2] | Julia Kitzmann[4,5] | Johan P. Woelber[5] | Christoph A. Ramseier[6] | Philippe Bouchard[1,2,7]

[1]Department of Periodontology, U.F.R. of Odontology, Université de Paris, Paris, France
[2]Department of Periodontology, Service d'Odontologie, AP-HP, Rothschild Hospital, Paris, France
[3]Inserm, Population-based Epidemiologic Cohorts Unit, UMS 011, Villejuif, France
[4]Private Practice, Hamburg, Germany
[5]Department of Operative Dentistry and Periodontology, Faculty of Medicine, University of Freiburg, Freiburg, Germany
[6]Department of Periodontology, School of Dental Medicine, University of Bern, Switzerland
[7]EA 2496, U.F.R. of Odontology, University of Paris, Paris, France

Correspondence
Philippe Bouchard, Department of Periodontology, Service of Odontology, Rothschild Hospital, AP-HP, 5 rue Santerre, 75012 Paris, France.
Email: philippe.bouchard.perio@gmail.com

Abstract

Aim: This systematic review investigates the impact of specific interventions aiming at promoting behavioural changes to improve oral hygiene (OH) in patients with periodontal diseases.

Methods: A literature search was performed on different databases up to March 2019. Randomized and non-randomized controlled trials evaluating the effects of behavioural interventions on plaque and bleeding scores in patients with gingivitis or periodontitis were considered. Pooled data analysis was conducted by estimating standardized mean difference between groups.

Results: Of 288 articles screened, 14 were included as follows: 4 studies evaluated the effect of motivational interviewing (MI) associated with OH instructions, 7 the impact of oral health educational programmes based on cognitive behavioural therapies, and 3 the use of self-inspections/videotapes. Studies were heterogeneous and reported contrasting results. Meta-analyses for psychological interventions showed no significant group difference for both plaque and bleeding scores. No effect was observed in studies applying self-inspection/videotapes.

Conclusions: Within the limitations of the current evidence, OH may be reinforced in patients with periodontal diseases by psychological interventions based on cognitive constructs and MI principles provided by oral health professionals. However, no conclusion can be drawn on their specific clinical efficacy as measured by reduction of plaque and bleeding scores over time.

KEYWORDS
behavioural changes, motivational interviewing, oral hygiene, periodontal diseases, psychological intervention

1 | INTRODUCTION

The main goal of periodontal therapy is to restore periodontal health. A prerequisite to achieve this objective is a low level of clinical periodontal inflammation (<10% of bleeding on probing) on either an anatomically intact periodontium or a reduced periodontium (Lang & Bartold, 2018b). Plaque control is at the forefront of the proximal risk factors leading to periodontitis (Bouchard, Carra, Boillot, Mora, & Range, 2017). Thus, among the known determinants of periodontal diseases, including predisposing local and systemic factors (e.g. dental restoration, uncontrolled diabetes) and environmental determinants (e.g. smoking, medications, stress, nutrition), oral hygiene (OH) appears as a key factor strongly linked to periodontal inflammation (Bouchard et al., 2017; Chapple et al., 2018; Lang & Bartold, 2018b).

(33)

DOI: 10.1111/jcpe.13264

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Adjunctive effect of systemic antimicrobials in periodontitis therapy: A systematic review and meta-analysis

Wim Teughels[1] | Magda Feres[2] | Valerie Oud[1] | Conchita Martín[3] | Paula Matesanz[4] | David Herrera[4]

[1]Department of Oral Health Sciences, KU Leuven & Dentistry (Periodontology), University Hospitals Leuven, Leuven, Belgium

[2]Department of Periodontology, Dental Research Division, Guarulhos University, Guarulhos, Brazil

[3]BIOCRAN (Craniofacial Biology) Research Group, University Complutense, Madrid, Spain

[4]ETEP (Etiology and Therapy of Periodontal Diseases) Research Group, University Complutense, Madrid, Spain

Correspondence
Wim Teughels, Department of Oral Health Sciences, KU Leuven & UZ Leuven, Kapucijnenvoer 33, 3000 Leuven, Belgium.
Email: Wim.Teughels@kuleuven.be

Abstract

Aim: To answer the following PICOS questions: in patients with periodontitis, which is the efficacy of adjunctive systemic antimicrobials, in comparison with subgingival debridement plus a placebo, in terms of probing pocket depth (PPD) reduction, in randomized clinical trials with at least 6 months of follow-up?

Material and Methods: A systematic search was conducted: 34 articles (28 studies) were included. Data on clinical outcome variables changes were pooled and analysed using weighted mean differences (WMDs), 95% confidence intervals (CI) and prediction intervals (PIs), in case of significant heterogeneity.

Results: For PPD, statistically significant benefits ($p < .001$) were observed in short-term studies (WMD = 0.448, 95% CI [0.324; 0.573], PI [−0.10 to 0.99]) and long-term studies (WMD = 0.485, 95% CI [0.322; 0.648], PI [−0.11 to 1.08]). Additionally, statistically significant benefits were also found for clinical attachment level, bleeding on probing, pocket closure and frequency of residual pockets. The best outcomes were observed for the combination of amoxicillin plus metronidazole, followed by metronidazole alone and azithromycin. Adverse events were more frequently reported in groups using systemic antimicrobials.

Conclusions: The adjunctive use of systemic antimicrobials in periodontal therapy results in statistically significant benefits in clinical outcomes, with more frequent adverse events in test groups using systemic antimicrobials.

KEYWORDS

meta-analysis, scaling and root planing, systematic review, systemic antimicrobials

1 | INTRODUCTION

Periodontitis is an infectious inflammatory disease triggered and aggravated by the dysbiosis of the subgingival microbiota. Periodontal treatments should promote significant clinical improvements and prevent further disease progression. There is compelling evidence that these clinical outcomes are achieved when the proportions of periodontal pathogens are reduced by treatment and the root surfaces are recolonized with a new microbial community harbouring higher proportions of host-compatible species (Haffajee, Teles, & Socransky, 2006; Teles, Teles, Frias-Lopez, Paster, & Haffajee, 2013). This striking shift in the subgingival microbial profile is not an easy undertaking, due to the organization of the oral microbiota in complex biofilm structures that help protect resident organisms from periodontal treatment and allow the survival of strict anaerobe pathogens, even in highly oxygenated areas of the mouth, such as shallow pockets, tongue, saliva and oral mucosa (Socransky & Haffajee, 2002).

Wim Teughels and Magda Feres contributed equally to this work.

Received: 21 July 2019 | Revised: 9 January 2020 | Accepted: 13 January 2020

DOI: 10.1111/jcpe.13259

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Efficacy of access flap procedures compared to subgingival debridement in the treatment of periodontitis. A systematic review and meta-analysis

Ignacio Sanz-Sánchez[1] | Eduardo Montero[1] | Filippo Citterio[2] | Federica Romano[2] | Ana Molina[1] | Mario Aimetti[2]

[1]Etiology and Therapy of Periodontal Diseases (ETEP) Research Group, University Complutense, Madrid, Spain

[2]Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy

Correspondence
Ignacio Sanz Sánchez, Facultad de Odontología, Universidad Complutense de Madrid, Plaza Ramón y Cajal s/n. 28040 Madrid, Spain.
Email: ignaciosanz@ucm.es

Funding information
This systematic review was self-funded.

Abstract

Aim: This systematic review aimed to answer the following focused questions: (a) "In patients with periodontitis, how effective are access flaps (AFs) as compared to subgingival debridement in attaining probing depth (PD) reduction?" and (b) "In patients with periodontitis, does the type of AF impact PD reduction?".

Material and Methods: Randomized clinical trials were searched in three databases. Besides PD, information concerning clinical attachment level (CAL) and other relevant outcomes was also collected. Meta-analyses were performed whenever possible and results were categorized based on the initial PD.

Results: Thirty-six publications were included. AFs resulted in a significantly greater PD reduction in deep pockets (>6 mm or ≥6 mm), as compared to subgingival debridement, in short- (n = 4; weighted mean difference [WMD] = 0.67 mm; 95% confidence interval [CI] 0.37,0.97; p < .001) and long-term studies (n = 4; WMD = 0.39 mm; 95% CI 0.09,0.70; p = .012), while in moderately deep pockets (4–6, 5–6 or 4–5 mm) only in short-term studies (n = 4; WMD = 0.34; 95% CI 0.21,0.46; p < .001). In shallow pockets (1–3 or 1–4 mm), AFs led to greater CAL (n = 7; WMD = −0.43 mm; 95% CI −0.56, −0.28; p < .001). There was not enough evidence to answer question PICO 2.

Conclusions: AFs resulted in greater PD reduction in the treatment of deep and moderate pockets.

KEYWORDS

clinical attachment level, periodontal debridement, periodontitis, probing depth, systematic review

1 | INTRODUCTION

The role of subgingival biofilm in the initiation and progression of periodontal diseases has been clearly established (Roberts & Darveau, 2015). Thus, adequate individual plaque control practices, and professional elimination of supra- and subgingival plaque and calculus are essential for the successful treatment of periodontitis (Graziani, Karapetsa, Alonso, & Herrera, 2017). In this context, cause-related periodontal therapy aims to mechanically remove subgingival biofilm and to control inflammation, either with non-surgical or surgical approaches, in order to arrest further attachment loss by reducing probing depth (PD), as sites with PD ≤ 4 mm are associated with lower risk of disease progression and tooth loss (Matuliene et al., 2008).

Non-surgical periodontal therapy consists on subgingival debridement. Traditionally, this approach has been done by means of

Received: 9 December 2017 | Revised: 11 March 2018 | Accepted: 12 March 2018
DOI: 10.1111/jcpe.12940

2017 WORLD WORKSHOP

WILEY Journal of Clinical Periodontology

Periodontal health and gingival diseases and conditions on an intact and a reduced periodontium: Consensus report of workgroup 1 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions

Iain L.C. Chapple[1] | Brian L. Mealey[2] | Thomas E. Van Dyke[3] | P. Mark Bartold[4] | Henrik Dommisch[5] | Peter Eickholz[6] | Maria L. Geisinger[7] | Robert J. Genco[8] | Michael Glogauer[9] | Moshe Goldstein[10] | Terrence J. Griffin[11] | Palle Holmstrup[12] | Georgia K. Johnson[13] | Yvonne Kapila[14] | Niklaus P. Lang[15] | Joerg Meyle[16] | Shinya Murakami[17] | Jacqueline Plemons[18] | Giuseppe A. Romito[19] | Lior Shapira[10] | Dimitris N. Tatakis[20] | Wim Teughels[21] | Leonardo Trombelli[22] | Clemens Walter[23] | Gernot Wimmer[24] | Pinelopi Xenoudi[25] | Hiromasa Yoshie[26]

[1]Periodontal Research Group, Institute of Clinical Sciences, College of Medical & Dental Sciences, University of Birmingham, UK
[2]University of Texas Health Science Center at San Antonio, USA
[3]The Forsyth Institute, Cambridge, MA, USA
[4]School of Dentistry, University of Adelaide, Australia
[5]Department of Periodontology and Synoptic Dentistry, Charité - Universitätsmedizin Berlin, Germany
[6]Department of Periodontology, Center for Oral Medicine, Johann Wolfgang Goethe-University Frankfurt, Germany
[7]Department of Periodontology, University of Alabama at Birmingham, USA
[8]Department of Oral Biology, SUNY at Buffalo, NY, USA
[9]Faculty of Dentistry, University of Toronto, Canada
[10]Department of Periodontology, Faculty of Dental Medicine, Hebrew University-Hadassah Medical Center, Jerusalem, Israel
[11]Periodontal Department, Tufts University School of Dental Medicine, Boston, MA, USA
[12]Periodontology, Section 1, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark
[13]Department of Periodontology, University of Iowa College of Dentistry, Iowa City, IA, USA
[14]Orofacial Sciences, University of California San Francisco, USA
[15]Department of Periodontology, University of Bern, Switzerland
[16]Department of Periodontology, University of Giessen, Germany
[17]Department of Periodontology, Graduate School of Dentistry, Osaka University, Japan
[18]Department of Periodontics, Texas A&M College of Dentistry, Dallas, TX, USA
[19]Division of Periodontology, Department of Stomatology, Dental School, University of São Paulo, Brazil
[20]Division of Periodontology, College of Dentistry, Ohio State University, Columbus, OH, USA
[21]Department of Oral Health Sciences, Periodontology, KU Leuven & Dentistry, University Hospitals Leuven, Belgium
[22]Research Center for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Italy
[23]Department of Periodontology, Endodontology & Cariology, University Centre for Dental Medicine, University of Basel School of Dentistry, Switzerland
[24]Department of Prosthodontics, School of Dentistry, Medical University Graz, Austria

(36)

PLOS | ONE

RESEARCH ARTICLE

Surgical and Non-Surgical Procedures Associated with Recurrence of Periodontitis in Periodontal Maintenance Therapy: 5-Year Prospective Study

Fernando Oliveira Costa[1☯]*, Luís Otávio Miranda Cota[1‡], José Roberto Cortelli[2☯], Sheila Cavalca Cortelli[2☯], Renata Magalhães Cyrino[1‡], Eugênio José Pereira Lages[1‡], Ana Paula Lima Oliveira[3☯]*

1 Department of Periodontology, Dentistry School, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil, **2** Center for Periodontal Research, University of Taubaté, Taubaté, São Paulo, Brazil, **3** Department of Periodontology, Dentistry School, Federal University of Uberlândia, Uberlândia, Minas Gerais, Brazil

☯ These authors contributed equally to this work.
‡ These authors also contributed equally to this work.
* focperio@uol.com.br (FOC); aplimaoliveira@yahoo.com.br (APLO)

OPEN ACCESS

Citation: Costa FO, Cota LOM, Cortelli JR, Cortelli SC, Cyrino RM, Lages EJP, et al. (2015) Surgical and Non-Surgical Procedures Associated with Recurrence of Periodontitis in Periodontal Maintenance Therapy: 5-Year Prospective Study. PLoS ONE 10(10): e0140847. doi:10.1371/journal.pone.0140847

Editor: Sompop Bencharit, University of North Carolina at Chapel Hill, UNITED STATES

Received: May 12, 2015

Accepted: October 1, 2015

Published: October 23, 2015

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: This study was supported by grants from the Minas Gerais State Foundation (FAPEMIG/Brazil) (PROJECT #10137) and from the National Counsel of Technological and Scientific Development (CNPq/Brazil) (project #471616 and #301493).

Competing Interests: The authors have declared that no competing interests exist.

Abstract

Background and Objective

Prospective studies that investigated the influence of surgical and nonsurgical procedures in the recurrence of periodontitis and tooth loss in periodontal maintenance therapy (PMT) programs have not been previously reported. The objective of this study was to evaluate longitudinally the recurrence of periodontitis in regular compliers (RC) and irregular compliers (IC) individuals undergoing surgical and non-surgical procedures over 5 years in a program of PMT.

Materials and Methods

A total of 212 individuals participated in this study. Full-mouth periodontal examination including bleeding on probing, probing depth, and clinical attachment level were determined at all PMT visits over 5 years. The recurrence of periodontitis was evaluated in RC and IC individuals undergoing surgical and non-surgical procedures in PMT. The influences of risk variables of interest were tested through univariate analysis and multivariate logistic regression.

Results

Recurrence of periodontitis was significantly lower among RC when compared to IC. Individuals with recurrence of periodontitis and undergoing surgical procedures showed higher probing depth and clinical attachment loss than those who received non-surgical

Journal of Clinical Periodontology

Official Journal of The European Federation of Periodontology

Founded by the British, Dutch, French, German, Scandinavian, and Swiss Societies of Periodontology

J Clin Periodontol 2009; 36: 514–522 doi: 10.1111/j.1600-051X.2009.01414.x

Journal of Clinical Periodontology

Supportive periodontal therapy of furcation sites: non-surgical instrumentation with or without topical doxycycline

Bettina Dannewitz[1,2], Katherine Lippert[2], Niklaus P. Lang[3,4], Maurizio S. Tonetti[3] and Peter Eickholz[2]

[1]Section of Periodontology, Department of Conservative Dentistry, Clinic for Oral, Dental and Maxillofacial Diseases, University Hospital Heidelberg, Heidelberg, Germany; [2]Department of Periodontology, Center for Dental, Oral, and Maxillofacial Medicine (Carolinum), Hospital of the Johann Wolfgang Goethe University Frankfurt/Main, Frankfurt/Main, Germany; [3]European Research Group on Periodontology (ERGO Perio), Genova, Italy; [4]Prince Philip Hospital, University of Hong-Kong, Hong-Kong

Dannewitz B, Lippert K, Lang NP, Tonetti MS, Eickholz P. Supportive periodontal therapy of furcation sites: non-surgical instrumentation with or without topical doxycycline. J Clin Periodontol 2009; 36: 514–522. doi: 10.1111/j.1600-051X. 2009.01414.x.

Abstract

Objectives: Evaluation of the clinical effect of topical subgingival application of doxycycline gel adjunctively to scaling and root planing (SRP) at furcation sites during supportive periodontal therapy (SPT).

Material and Methods: In 39 SPT patients exhibiting at least four pockets $\geqslant 5$ mm with bleeding on probing, SRP was rendered in all pockets $\geqslant 4$ mm. Additionally, 14% doxycycline gel was applied subgingivally in 20 patients after random assignment (SRP&DOXY). Clinical parameters were assessed at baseline, 3, 6, and 12 months after therapy. Additional benefit of topical doxycycline was evaluated as a short-term (3 months) improvement of furcation involvement and influence on the frequency of re-instrumentation up to 12 months.

Results: A total of 323 furcation sites (class 0: 160; class I: 101; class II: 18; and class III: 44) were treated (SRP: 165, SRP&DOXY: 158). SRP&DOXY resulted in better improvement of furcation involvement than SRP alone 3 months after treatment ($p = 0.041$). However, SRP&DOXY failed to show a significant difference between both groups in the number of re-instrumentations.

Conclusion: Single subgingival application of doxycycline in addition to SRP had a short-term effect on furcation involvement. However, it failed to reduce the frequency of re-instrumentation up to 12 months at furcation sites.

Key words: randomised controlled clinical trial; furcation involvement; supportive periodontal treatment; topical subgingival doxycycline

Accepted for publication 24 March 2009

Furcation-involved molars respond less favourably to periodontal therapy than molars without furcation involvement or single-rooted teeth and are at a greater risk for further attachment loss (Nordland et al. 1987, Loos et al. 1989, Wang et al. 1994) compared with other teeth. This problem was also described by Kalkwarf et al. (1988), who reported the success of different surgical and non-surgical treatment modalities on 158 molars. During the 2-year observation period, the horizontal defect in the furcation area increased independently of the therapy performed.

Numerous factors contribute to a more severe disease progression in furcation-involved molars, recurrent periodontal infection, and as a result an inferior long-term prognosis of these teeth (McGuire & Nunn 1996, Dannewitz et al. 2006, Pretzl et al. 2008). These factors include morphological features such as enamel projections and accessory pulpal canals into the furcation (Pontoriero et al. 1989), anatomy that impedes accessibility for individual oral hygiene in the molar region (Lang et al. 1973), and professional root debridement (Fleischer et al. 1989).

Hirschfeld & Wasserman (1978) examined retrospectively the periodontal conditions of 600 patients who had been previously treated for 15–55 years. Over the 22-year average period of maintenance, 7.1% of all teeth were lost due to periodontal causes. The tooth loss rate of those teeth with furcation involvement was much higher (31%). Similar results were reported by McFall (1982), who observed an overall tooth

Conflict of interests and source of funding

The authors declare that they have no conflict of interests.

This study was funded by Ivoclar Vivadent AG, Schaan, Liechtenstein.

(38)

Received: 16 July 2019 | Revised: 9 December 2019 | Accepted: 16 December 2019
DOI: 10.1111/jcpe.13241

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Resective surgery for the treatment of furcation involvement: A systematic review

Henrik Dommisch[1,2] | Clemens Walter[3] | Bettina Dannewitz[4] | Peter Eickholz[4]

[1]Department of Periodontology and Synoptic Dentistry, Charité - Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin, Humboldt-Universität zu Berlin, Berlin, Germany

[2]Berlin Institute of Health, Berlin, Germany

[3]Department of Periodontology, Endodontology and Cariology, University Center for Dental Medicine (UZB), University of Basel, Basel, Switzerland

[4]Department of Periodontology, Johann Wolfgang Goethe-University Frankfurt, Frankfurt, Germany

Correspondence
Peter Eickholz, Department of Periodontology, Center for Dentistry and Oral Medicine (Carolinum), Johann Wolfgang Goethe-University Frankfurt am Main, Theodor-Stern-Kai 7 (Haus 29), 60596 Frankfurt am Main, Germany.
Email: eickholz@med.uni-frankfurt.de

Funding information
This study was funded by the authors and their institutions.

Abstract

Objective: To evaluate the benefit of resective surgical periodontal therapy (root amputation or resection, root separation, tunnelling) in periodontitis patients exhibiting class II and III furcation involvement (FI) compared with non-surgical treatment (SRP) or open flap debridement (OFD).

Material: Outcomes were tooth survival (primary), vertical probing attachment gain, and reduction in probing pocket depth (secondary) evidenced by randomized clinical trials, prospective and retrospective cohort studies and case series with ≥ 12 months of follow-up. Search was performed on 3 electronic databases from January 1998 to December 2018.

Results: From a total of 683 articles, 66 studies were identified for full-text analysis and 7 studies finally included. Six hundred sixty-seven patients contributed 2,021 teeth with class II or III FI. Data were very heterogeneous regarding follow-up and distribution of FI. A total of 1,515 teeth survived 4 to 30.8 years after therapy. Survival ranged from 38%–94.4% (root amputation or resection, root separation), 62%–67% (tunnelling), 63%–85% (OFD) and 68%–80% (SRP). Overall, treatment provided better results for class II FI than class III.

Conclusion: Within their limits, the data indicate that in class II and III FI, SRP and OFD may result in similar survival rates as root amputation/resection, root separation or tunnelling.

KEYWORDS
furcation involvement, long-term survival, periodontitis, resective surgery

1 | INTRODUCTION

In multi-rooted teeth, periodontitis leads to periodontal destruction not only vertically but also horizontally between the roots creating furcation involvement (FI). Furcation-involved molars are at greater risk for further attachment loss than teeth without furcation involvement (Loos, Nylund, Claffey, & Egelberg, 1989; Nordland et al., 1987; Wang, Burgett, Shyr, & Ramfjord, 1994). They exhibit a higher risk for tooth loss than molars without furcation involvement or single-rooted teeth (Helal et al., 2019; Matuliene et al., 2008; Pretzl, Kaltschmitt, Kim, Reitmeir, & Eickholz, 2008). The prognosis of furcation-involved teeth depends on the degree of FI and the amount of residual attachment. While molars with class I FI show a similar prognosis as molars without FI, class II and III (Eickholz & Walter, 2018;

Maintenance: The Key to Successful Periodontal and Implant Therapy

Pamela K. McClain, DDS

ABSTRACT

The management of periodontal diseases requires an effective treatment and maintenance program, as well as collaboration among clinicians. Having a better understanding of the factors contributing to periodontal maintenance is key. The components of a maintenance program and determining proper intervals ensure that patients increase their chances for maintaining their teeth and implants in an optimal state of health.

According to a 2009 to 2010 study conducted by the Centers for Disease Control and Prevention, 47.2% of American adults suffer from periodontitis.[1] With the increasing prevalence of periodontitis, clinicians are faced with the responsibility of treating and maintaining more patients with this chronic disease. Compared to gingivitis or peri-implant mucositis, which are reversible inflammatory conditions without bone loss, periodontitis and peri-implantitis result in progressive bone loss and tissue destruction.[2,3] Periodontal disease requires lifelong treatment and management. Treatment of periodontitis typically starts with non-surgical scaling and root planing. However, moderate to severe periodontitis is often managed best with periodontal surgery, depending on multiple patient and case factors.

With the increase in the number of implants being placed, there has also been an increase in the amount of peri-implant disease. The prevalence of peri-implantitis (ie, bone loss around implants) ranges from 9.6% to 47% of implants.[4,5] Management of peri-implantitis has not yet been well established and can be difficult to treat. A number of different risk factors have been associated with the onset of peri-implantitis, including periodontitis, smoking, diabetes, residual cement, and others.

Successful management of periodontal disease creates an environment conducive to long-term management by the patient and dental team. The goal of treatment is to achieve and maintain the oral cavity in a state of optimal health, function, comfort, and esthetics throughout the patient's lifetime.

Defining Maintenance

Periodontal maintenance therapy is defined as those procedures that follow active periodontal treatment and assist the patient in maintaining oral health. Designed to be performed at intervals appropriate for each specific individual, periodontal maintenance therapy includes a variety of procedures. Becker et al[6] found that periodontal therapy without maintenance was of little to no value in terms of restoring periodontal health. Studies conducted by Hirschfeld et al[7] and Axelsson et al[8] found that effectively planned and executed periodontal treatment programs with long-term maintenance therapy controlled disease progression and preserved the dentition of most patients. Patients with dental implants also benefit from an effective maintenance program. Fardal et al[9] looked at 43 periodontal patients with implants over a minimum of 7 years.

LEARNING OBJECTIVES:

- List the factors that facilitate periodontal maintenance
- Discuss the importance of periodontal maintenance in periodontal therapy
- Describe the components of a periodontal maintenance visit and differentiate maintenance intervals needs

(40)

Received: 26 April 2018 | Revised: 30 October 2018 | Accepted: 26 November 2018
DOI: 10.1111/jcpe.13041

OTHER

WILEY Journal of Clinical Periodontology

Time between recall visits and residual probing depths predict long-term stability in patients enrolled in supportive periodontal therapy*

Christoph A. Ramseier[1] | Martina Nydegger[1] | Clemens Walter[2] | Gabriel Fischer[3] | Anton Sculean[1] | Niklaus P. Lang[1] | Giovanni E. Salvi[1]

[1]Department of Periodontology, School of Dental Medicine, University of Bern, Bern, Switzerland

[2]Department of Periodontology, Endodontology and Cariology, School of Dental Medicine, University of Basel, Basel, Switzerland

[3]Significantis GmbH, Bern, Switzerland

Correspondence
Christoph A. Ramseier, Department of Periodontology, School of Dental Medicine, University of Bern, Bern, Switzerland.
Email: christoph.ramseier@zmk.unibe.ch

Funding information
Swiss National Program to Stop Smoking, Switzerland; Swiss Dental Association (SSO), Grant/Award Number: 306-18

Abstract

Aim: To relate the time between recall visits and residual periodontal probing depths (PPDs) to periodontal stability in patients enrolled in supportive periodontal therapy (SPT).

Materials and methods: Retrospective data on residual PPDs from 11,842 SPT visits were evaluated in SPT patients at the Medi School of Dental Hygiene (MSDH), Bern, Switzerland, 1985–2011. A residual PPD-based algorithm was developed to compute SPT intervals with no expected change of residual PPD.

Results: A total of 883 patients aged 43.9 (±13.0) years and 55.4% (n = 489) being females were identified. Linear mixed model analysis yielded highest statistically significant impact on PPD change with time between SPT visits, presence of residual PPD ≥4 mm, and bleeding on probing ($p < 0.0001$). Patients returning for SPT five times consecutively earlier than computed presented mean % PPDs ≥4 mm of 5.8% (±3.9) compared with patients returning later (19.2%, ±7.6) ($p < 0.0001$). Additionally, patients attending >50% of their SPT visits earlier versus later demonstrated increased periodontal stability after 5 years ($p = 0.0002$) and a reduced frequency of tooth loss (0.60, ±0.93 versus 1.45, ±2.07) after 20 years ($p < 0.0001$).

Conclusions: To reach and maintain periodontal stability during SPT, individual quantitative data from comprehensive residual PPD profiles may contribute to the improved planning of SPT intervals.

KEYWORDS
recall interval, residual probing depths, supportive periodontal therapy

1 | INTRODUCTION

Treatment of periodontal disease aims at reducing the patient's inflammatory burden thus preventing further disease progression and subsequent tooth loss. In most cases, this goal can be achieved through initial non-surgical therapy and periodontal surgery targeting both infection control and pocket reduction (Badersten, Nilveus, & Egelberg, 1984; Lindhe, Socransky, Nyman, Haffajee, & Westfelt, 1982). Successful treatment outcomes are frequently associated with decreased periodontal probing depths (PPDs) possibly leading to "closed periodontal pockets" and residual PPDs of 4 mm or less (Tomasi & Wennström, 2017).

Due to the chronic nature of the disease, following active periodontal therapy (APT), lifelong compliance with supportive

*The manuscript was awarded with the 2018 Jaccard Prize of the European Federation of Periodontology.

Received: 29 August 2019 | Revised: 20 January 2020 | Accepted: 10 February 2020
DOI: 10.1111/jcpe.13275

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Mechanical plaque removal of periodontal maintenance patients: A systematic review and network meta-analysis

Dagmar E. Slot[1] | Cees Valkenburg[1,2] | G.A. (Fridus) Van der Weijden[1]

[1]Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

[2]General dentist and clinical epidemiologist, Hoevelaken, The Netherlands

Correspondence
Dagmar E. Slot, Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and VU University Amsterdam, Gustav Mahlerlaan 3004, 1081 LA Amsterdam, The Netherlands.
Email: d.slot@acta.nl

Funding information
This research received no specific grant from any funding agency in the public, commercial, or non-profit sectors. The work for this paper was funded by the regular academic appointments of Slot and Van der Weijden at the Academic Centre for Dentistry Amsterdam (ACTA).

Abstract

Aim: This systematic review synthesizes the available clinical evidence concerning efficacy of mechanical oral hygiene devices in periodontal maintenance patients.

Material and Methods: Three databases were searched up to October 2019 for clinical trials conducted in adult patients in periodontal maintenance which evaluated the effect of toothbrushes or an interdental device on plaque removal and parameters of periodontal diseases. Descriptive analysis and network meta-analysis (NMA) were performed.

Results: Sixteen eligible publications, including 17 relevant comparisons, were retrieved. Four out of five comparisons found no clinical difference between a manual and power toothbrush. Of the interdental cleaning devices, the interdental brushes (IDBs) reduced plaque scores more effectively than a manual toothbrush alone. For the oral irrigator, two out of three comparisons indicated a positive effect on gingivitis scores, and probing pocket depth. The NMA demonstrated that for plaque removal the adjuvant use of IDBs was significantly more effective than the manual toothbrush alone. For the reduction of gingival inflammation, no product ranked higher than the manual toothbrush.

Conclusion: Due to the scarcity of studies that met the inclusion criteria for each of the oral hygiene devices and the low certainty of the resultant evidence, no strong "evidence-based" conclusion can be drawn concerning any specific oral hygiene device for patient self-care in periodontal maintenance.

KEYWORDS
interdental devices, maintenance, supportive periodontal therapy, toothbrush

1 | INTRODUCTION

Periodontitis is a ubiquitous and inflammatory condition that represents a significant public health burden (Chapple et al., 2015). Severe periodontitis affects over 11% of adults; is a major cause of tooth loss that negatively impacts speech, nutrition, quality of life and self-esteem; and has systemic inflammatory consequences (Kassebaum et al., 2014). Periodontitis is bacterially induced, and the responding chronic inflammatory process results in loss of the connective tissues and bone that support teeth (Lang, 2014). Periodontal treatment consists of a phase of active periodontal therapy (APT), which is followed by supportive periodontal therapy (SPT) to reduce the risk of re-infection and progression of the disease. SPT includes a periodontal re-evaluation and risk assessment and supragingival and subgingival removal of bacterial plaque and calculus. Evaluation of oral hygiene performance and motivation and re-instruction in oral hygiene practices are necessary for the long-term success of periodontal treatment (Tonetti, Chapple, Jepsen, & Sanz, 2015; Tonetti, Eickholz, et al., 2015). Effective plaque control practices are particularly important for periodontitis patients because they

(42)

Accepted: 14 April 2017
DOI: 10.1111/idh.12288

REVIEW ARTICLE

WILEY International Journal of Dental Hygiene

Periodontal maintenance following active specialist treatment: Should patients stay put or return to primary dental care for continuing care? A comparison of outcomes based on the literature

PG Leavy[1] | DP Robertson[2]

[1]Department of Restorative Dentistry, Charles Clifford Dental Hospital, Sheffield, UK

[2]Department of Restorative Dentistry, Glasgow Dental School, School of Medicine, College of Medicine, Veterinary and Life Sciences, University of Glasgow, Glasgow, UK

Correspondence
Paul G Leavy, Department of Restorative Dentistry, Charles Clifford Dental Hospital, Sheffield S10 2SZ, UK.
Email: paulleavy@ymail.com

Abstract

Objectives: To review the evidence for the efficacy of periodontal maintenance (PM) carried out in primary dental care (PDC) compared to the specialist setting for patients previously treated in a specialist setting for chronic (ChP) or aggressive (AgP) periodontitis.

Methods: A focused PICO question and search protocol were developed. Online databases including MEDLINE, EMBASE, WEB OF SCIENCE™ and COCHRANE LIBRARY were searched along with specialist journals in the subject area of periodontal research. Selection criteria included studies that investigated delivery of PM in both specialist and PDC settings for patients with ChP or AgP over a minimum 12 months. We looked for studies that reported changes in clinical attachment levels (CAL), tooth loss, pocket probing depths (PPDs) and bleeding on probing (BoP) as outcome measures.

Results: Eight cohort studies were chosen for inclusion. There was considerable heterogeneity found between the eight studies, which did not allow for quantitative (meta) analysis and statistical testing of differences between groups. Clinical attachment levels remained relatively stable in patients who received specialist PM with mean changes of −0.42 mm to +0.2 mm, while for those enrolled in PDC-based PM for periods >12 months, mean CAL losses were between −0.13 mm and −2.80 mm. PPD reduction for those subjects receiving specialist PM was between 0.05 and 1.8 mm for five studies but two cohorts experienced increases of 0.32 and 0.80 mm, respectively. Increases of up to 2.90 mm (range: −0.1 to +2.90) and a higher proportion of deeper pockets were noted among PDC PM cohorts. Higher rates of BoP among those in receipt of PDC PM were reported in half of all studies. There were insufficient long-term data to make any firm conclusions about the effect of the delivery of PM on tooth loss.

Conclusion: Within the limitations of the data available, it appears that specialist PM is effective in sustaining periodontal stability following active specialist intervention. There is limited evidence that PDC provides the same level of care; however, the limited comparative data available suggest that outcomes could be slightly worse in PDC.

KEYWORDS
dental hygiene profession, maintenance, oral hygiene, periodontitis

Received: 27 October 2018 | Revised: 17 May 2019 | Accepted: 29 May 2019

DOI: 10.1002/JPER.18-0637

JOURNAL OF Periodontology

ORIGINAL ARTICLE

The use of interdental brushes or oral irrigators as adjuvants to conventional oral hygiene associated with recurrence of periodontitis in periodontal maintenance therapy: A 6-year prospective study

Fernando Oliveira Costa | **Amanda Almeida Costa** | **Luís Otávio Miranda Cota**

Department of Dental Clinics, Oral Pathology, and Oral Surgery, School of Dentistry, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

Correspondence
Fernando Oliveira Costa, Department of Periodontology, School of Dentistry, Federal University of Minas Gerais, Antônio Carlos Avenue, 6627, Pampulha, PO Box 359, Belo Horizonte 31270-901, Minas Gerais, Brazil.
Email: focperio@uol.com.br

Abstract

Background: Prospective studies investigating the influence of adjuvants to oral hygiene procedures on the recurrence of periodontitis (RP) during periodontal maintenance therapy (PMT) programs have not been previously reported. The aim of this study was to compare the effect of oral irrigator devices or interdental brushes as adjuncts to toothbrushing associated with dental flossing to improving periodontal condition and reducing RP among individuals under PMT.

Methods: From a 6-year prospective PMT cohort study (n = 268), 142 individuals who attended at least one PMT visit within 12 months were determined to be eligible. According to oral hygiene adjuvants use, they were categorized into three groups: 1) manual brushing/dental flossing + interdental brushes (BDF + Ib; n = 44); 2) manual brushing/dental flossing + oral irrigator (BDF + Oi; n = 36); and 3) only manual brushing/dental flossing (BDF; n = 62). Full-mouth periodontal examination and oral hygiene habits were evaluated at two time points: T1 (after active periodontal therapy) and T2 (6 years).

Results: RP was significantly higher among BDF when compared with BDF + Ib and BDF + Oi. The final logistic model in T2 for RP included the following items: manual brushing/dental flossing alone (odds ratio [OR] = 1.94); age > 50 years (OR = 1.98), smoking (OR = 3.51), bleeding on probing >30% sites (OR = 4.10), and the interaction between manual brushing/dental flossing alone and smoking (OR = 6.1). A protective effect on RP was observed in BDF + Oi individuals (OR = 0.52).

Conclusions: BDF + Ib and BDF + Oi individuals presented lower rates of RP and better periodontal condition when compared to BDF individuals. Including these adjuvants to conventional oral hygiene have shown to improve biofilm control during PMT leading to a better periodontal status maintenance.

KEYWORDS
compliance, maintenance, oral hygiene, periodontitis

(45)

J Clin Periodontol 2001; 28: 296–305
Printed in Denmark . All rights reserved

Journal of Clinical Periodontology
ISSN 0303-6979

Amoxicillin plus metronidazole in the treatment of adult periodontitis patients

A double-blind placebo-controlled study

E. G. Winkel[1,3], A. J. Van Winkelhoff[2], M. F. Timmerman[1], U. Van der Velden[1] and G. A. Van der Weijden[1,4]
Departments of [1]Periodontology and [2]Oral Biology, Academic Centre for Dentistry Amsterdam, Clinics for Periodontology, [3]Amsterdam and [4]Utrecht, The Netherlands

Winkel EG, Van Winkelhoff AJ, Timmerman MF, Van der Velden U, Van der Weijden GA: Amoxicillin plus metronidazole in the treatment of adult periodontitis patients. A double-blind placebo-controlled study. J Clin Periodontol 2001; 28: 296–305. © Munksgaard, 2001.

Abstract
Background, aims: The aim of this double-blind, parallel study was to evaluate the adjunctive effects of systemically administered amoxicillin and metronidazole in a group of adult periodontitis patients who also received supra- and subgingival debridement.
Methods: 49 patients with a diagnosis of generalised severe periodontitis participated in the study. Random assignment resulted in 26 patients in the placebo (P) group with a mean age of 40 years and 23 patients in the test (T) group which had a mean age of 45 years. Clinical measurements and microbiological assessments were taken at baseline and 3 months after completion of initial periodontal therapy with additional placebo or antibiotic treatment. Patients received coded study medication of either 375 mg amoxicillin in combination with 250 mg metronidazole or identical placebo tablets, every 8 hours for the following 7 days.
Results: At baseline, no statistically significant differences between groups were found for any of the clinical parameters. Except for the plaque, there was a significantly larger change in the bleeding, probing pocket depth (PPD) and clinical attachment level (CAL) in the T-group as compared to the P-group after therapy. The greatest reduction in PPD was found at sites with initial PPD of ⩾7 mm, 2.5 mm in the P-group and 3.2 mm in the T-group. The improvement in CAL was most pronounced in the PPD category ⩾7 mm and amounted to 1.5 mm and 2.0 mm in the P- and T-groups, respectively. No significant decrease was found in the number of patients positive for any of the test species in the P-group. The number of patients positive for *Porphyromonas gingivalis*, *Bacteroides forsythus* and *Prevotella intermedia* in the T-group showed a significant decrease. After therapy there was a significant difference between the P- and the T- group in the remaining number of patients positive for *P. gingivalis*, *B. forsythus* and *Peptostreptococcus micros.* 4 subgroups were created on the basis of the initial microbiological status for *P. gingivalis* positive (Pg-pos) and negative patients (Pg-neg) in the P- and the T-groups. The difference in reduction of PPD between Pg-pos and Pg-neg patients was particularly evident with respect to the changes in % of sites with a probing pocket depth ⩾5 mm. This % decreased from 45% at baseline to 23% after treatment in the Pg-pos placebo subgroup and decreased from 46% to 11% in the Pg-pos test subgroup ($p \leqslant 0.005$). In contrast, the changes in the proportions of sites with a probing pocket depth ⩾5 mm in the Pg-neg placebo and Pg-neg test subgroup were similar, from 43% at baseline to 18% after treatment versus 40% to 12%, respectively.
Conclusions: This study has shown that systemic usage of metronidazole and amoxicillin, when used in conjunction with initial periodontal treatment in

(46)

Cochrane Library

Cochrane Database of Systematic Reviews

Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis (Review)

Manresa C, Sanz-Miralles EC, Twigg J, Bravo M

Manresa C, Sanz-Miralles EC, Twigg J, Bravo M.
Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis.
Cochrane Database of Systematic Reviews 2018, Issue 1. Art. No.: CD009376.
DOI: 10.1002/14651858.CD009376.pub2.

www.cochranelibrary.com

WILEY

(47)

Received: 27 July 2019 | Revised: 12 December 2019 | Accepted: 14 December 2019
DOI: 10.1111/jcpe.13237

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Regenerative surgery versus access flap for the treatment of intra-bony periodontal defects: A systematic review and meta-analysis

Luigi Nibali[1] | Vasiliki P. Koidou[2] | Michele Nieri[3] | Luigi Barbato[3] | Umberto Pagliaro[3] | Francesco Cairo[3]

[1]Periodontology Unit, Faculty of Dentistry, Oral & Craniofacial Sciences, Centre for Host-Microbiome Interactions, King's College London, London, UK
[2]Centre for Oral Immunobiology and Regenerative Medicine and Centre for Oral Clinical Research, Institute of Dentistry, Queen Mary University London (QMUL), London, UK
[3]Research Unit in Periodontology and Periodontal Medicine, Department of Clinical and Experimental Medicine, University of Florence, Florence, Italy

Correspondence
Francesco Cairo, via fra' Giovanni Angelico 51, 50121 Florence, Italy.
Email: cairofrancesco@virgilio.it

Abstract

Background: The aim of this systematic review was to compare clinical, radiographic and patient-reported outcomes (PROMs) in intra-bony defects treated with regenerative surgery or access flap.

Materials and Methods: A systematic review protocol was written following the PRISMA checklist. Electronic and hand searches were performed to identify randomized clinical trials (RCTs) on regenerative treatment of deep intra-bony defects (≥3 mm) with a follow-up of at least 12 months. Primary outcome variables were probing pocket depth (PPD) reduction, clinical attachment level (CAL) gain and tooth loss. Secondary outcome variables were Rec, radiographic bone gain, pocket "closure," PROMs and adverse events. Meta-analysis was carried out when possible. To evaluate treatment effect, odds ratios were combined for dichotomous data and mean differences for continuous data using a random-effect model.

Results: A total of 79 RCTs (88 articles) published from 1990 to 2019 and accounting for 3,042 patients and 3,612 intra-bony defects were included in this systematic review. Only 10 of included studies were rated at low risk of bias. A total of 13 meta-analyses were performed. All regenerative procedures provided adjunctive benefit in terms of CAL gain (1.34 mm; 0.95–1.73) compared with open flap debridement alone. Both enamel matrix derivative (EMD) and guided tissue regeneration (GTR) were superior to OFD alone in improving CAL (1.27 mm; 0.79–1.74 mm and 1.43 mm; 0.76–2.22, respectively), although with moderate–high heterogeneity. Among biomaterials, the addition of deproteinized bovine bone mineral (DBBM) improved the clinical outcomes of both GTR with resorbable barriers and EMD. Papillary preservation flaps enhanced the clinical outcomes. The strength of evidence was low to moderate.

Conclusion: EMD or GTR in combination with papillary preservation flaps should be considered the treatment of choice for residual pockets with deep (≥3 mm) intra-bony defects.

KEYWORDS
enamel matrix derivatives, intra-bony defect, meta-analysis, periodontal pocket, periodontal regeneration, systematic review

(48)

J Clin Periodontol 2016; 43: 53–62 doi: 10.1111/jcpe.12488

Journal of Clinical Periodontology

Case Report

Loss of molars in periodontally treated patients: results 10 years and more after active periodontal therapy

Bettina Dannewitz[1,2], Anna Zeidler[1], Johannes Hüsing[3], Daniel Saure[4], Thorsten Pfefferle[5], Peter Eickholz[6] and Bernadette Pretzl[1]

[1]Section of Periodontology, Department of Conservative Dentistry, Clinic for Oral, Dental and Maxillofacial Diseases, University Hospital Heidelberg, Heidelberg, Germany; [2]Private Dental Practice, Weilburg, Germany; [3]Coordination Centre for Clinical Trials (KKS), University of Heidelberg, Heidelberg, Germany; [4]Institute of Medical Biometry and Informatics (IMBI), University of Heidelberg, Heidelberg, Germany; [5]Section of Endodontology, Department of Conservative Dentistry, Clinic for Oral, Dental and Maxillofacial Diseases, University Hospital Heidelberg, Heidelberg, Germany; [6]Department of Periodontology, Center of Dentistry and Oral Medicine (Carolinum), Johann Wolfgang Goethe-University Frankfurt, Frankfurt, Germany

Dannewitz B, Zeidler A, Hüsing J, Saure D, Pfefferle T, Eickholz P, Pretzl B. Loss of molars in periodontally treated patients: results 10 years and more after active periodontal therapy. J Clin Periodontol 2016; 43: 53–62. doi: 10.1111/jcpe.12488

Abstract

Aim: To identify risk factors for loss of molars during supportive periodontal therapy (SPT).

Materials and Methods: A total of 136 subjects with 1015 molars at baseline were examined retrospectively. The association of risk factors with loss of molars was assessed using a multilevel Cox regression analysis. Furcation involvement (FI) was assessed clinically at start of periodontal therapy and assigned according to Hamp et al. (1975).

Results: Fifty molars were extracted during active periodontal therapy (APT) and 154 molars over the average SPT period of 13.2 ± 2.8 years. FI degree III (HR 4.68, $p < 0.001$), baseline bone loss (BL) > 60% (HR 3.74, $p = 0.009$), residual mean probing pocket depth (PPD, HR 1.43, $p = 0.027$), and endodontic treatment (HR 2.98, $p < 0.001$) were identified as relevant tooth-related factors for loss of molars during SPT. However, mean survival time for molars with FI III or BL > 60% were 11.8 and 14.4 years, respectively. Among the patient data, age (HR 1.57, $p = 0.01$), female gender (HR 1.99, $p = 0.035$), smoking (HR 1.97, $p = 0.034$), and diabetes mellitus (HR 5.25, $p = 0.021$) were significant predictors for loss of molars.

Conclusion: Overall, periodontal therapy results in a good prognosis of molars. Degree III FI, progressive BL, endodontic treatment, residual PPD, age, female gender, smoking, and diabetes mellitus strongly influence the prognosis for molars after APT.

Key words: furcation involvement; long-term; molar; supportive periodontal therapy; tooth loss

Accepted for publication 29 November 2015

Periodontitis is among the most prevalent of chronic diseases, and the numbers of patients keep rising (Micheelis & Schiffner 2006). A recent publication concluded that periodontitis is highly prevalent in Germany among other European countries (Holtfreter et al. 2010). Additionally, periodontitis forms one of the main causes for tooth loss among adults (Ong 1998, Burt 2005), which – apart from concerns directly related to the oral cavity – may result in a reduced quality of life (Mack et al. 2005). The effectiveness of periodontal therapy in arresting disease progression has been documented, and for patients under

Conflict of interest and source of funding statement
The authors declare that they have no financial or other relationships that might lead to a conflict of interest. This study was self-funded by the authors and their institutions.

Received: 14 August 2019 | Revised: 17 December 2019 | Accepted: 17 December 2019
DOI: 10.1111/jcpe.13246

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

The efficacy of pocket elimination/reduction compared to access flap surgery: A systematic review and meta-analysis

David Polak[1] | Asaf Wilensky[1] | Georgios N. Antonoglou[2] | Lior Shapira[1] | Moshe Goldstein[1] | Conchita Martin[3]

[1]Faculty of Dental Medicine (Periodontology), The Hebrew University – Hadassah, Jerusalem, Israel
[2]Universidad Complutense de Madrid (ETEP), Madrid, Spain
[3]Universidad Complutense de Madrid (BIOCRAN), Madrid, Spain

Correspondence
Lior Shapira, Department of Periodontology, The Hebrew University-Hadassah Medical Center, P.O. Box 12272, Jerusalem 91120, Israel.
Email: lior.shapira@ekmd.huji.ac.il

Abstract

Aim: To assess the efficacy and adverse effects of resective surgery compared to access flap in patients with periodontitis.

Methods: Randomized controlled trials with a follow-up ≥6 months were identified in ten databases. Screening, data extraction, and quality assessment were conducted by two reviewers. The primary outcome was probing pocket depth, and the main secondary outcome was clinical attachment level. Data on adverse events were collected. Meta-analysis was used to synthesize the findings of trials.

Results: A total of 880 publications were identified. Fourteen publications from nine clinical trials met the inclusion criteria and were included for analysis. Meta-analysis was carried out using all available results. The results indicated superior pocket depth reduction following resective surgery compared to access flap after 6–12 months of follow-up (weighted mean difference 0.47 mm; confidence interval 0.7–0.24; $p = .010$). After 36–60 months of follow-up, no differences were found between the two treatments in pocket depth and attachment level. The prevalence of adverse effects was not different between the groups. Post-operative recession tended to be more severe for the resective approaches.

Conclusion: Resective surgical approach was superior to access flap in reducing pocket depth 6–12 months post-surgery, while no differences between the two modalities were found at 36–60 months of follow-up.

KEYWORDS
periodontal pocket, periodontal surgery, periodontitis, pocket reduction, systematic review

1 | INTRODUCTION

Periodontitis is a chronic inflammatory disease that leads to the destruction of the periodontal attachment apparatus and possible tooth loss (Page & Schroeder, 1976; Savage, Eaton, Moles, & Needleman, 2009). Disease progression induces an apical migration of the attachment apparatus with periodontal pocket formation (Bosshardt & Schroeder, 1988). The main goal of periodontal therapy is to arrest the destructive outcome of this disease. It is broadly accepted that probing pocket depth (PPD) reduction via various treatment approaches may improve the prognosis of the individual teeth (Nunn et al., 2012). In order to maintain periodontal health, treatment aims are to reduce PPD, maintain or improve clinical attachment level (CAL), and resolve periodontal inflammation.

In view of the previous objectives, treatment of periodontitis includes a wide range of interventions: education of the patient for self-plaque control (Jonsson, Baker, Lindberg, Oscarson, & Ohrn, 2012; Jonsson, Ohrn, Lindberg, & Oscarson, 2010), smoking cessation (Chaffee, Couch, & Ryder, 2016; Ramseier & Suvan, 2015),

Polak and Wilensky contributed equally to the article.

Received: 20 August 2019 | Revised: 11 December 2019 | Accepted: 16 December 2019

DOI: 10.1111/jcpe.13238

SYSTEMATIC REVIEW

Journal of Clinical Periodontology WILEY

Regenerative surgical treatment of furcation defects: A systematic review and Bayesian network meta-analysis of randomized clinical trials

Søren Jepsen[1] | Stefano Gennai[2] | Josefine Hirschfeld[3] | Zamira Kalemaj[4] | Jacopo Buti[5] | Filippo Graziani[2]

[1]Department of Periodontology, Operative and Preventive Dentistry, University Hospital Bonn, Bonn, Germany

[2]Sub-Unit of Periodontology, Halitosis and Periodontal Medicine, University Hospital of Pisa, Pisa, Italy

[3]Birmingham Dental School & Hospital, Birmingham, UK

[4]Private Practice, Milano, Italy

[5]Unit of Periodontology, UCL Eastman Dental Institute, London, UK

Correspondence
Søren Jepsen, Department of Periodontology, Operative and Preventive Dentistry, University Hospital Bonn, Welschnonnenstr. 17, 53111 Bonn, Germany.
Email: sjepsen@uni-bonn.de

Abstract

Aims: To investigate the clinical performance of regenerative periodontal surgery in the treatment of furcation defects versus open flap debridement (OFD) and to compare different regenerative modalities.

Material and Methods: A systematic search was conducted to identify RCTs evaluating regenerative surgical treatment of furcations with a minimum of 12-month follow-up. Three authors independently reviewed, selected and extracted data from the search conducted and assessed risk of bias. Primary outcomes were tooth loss, furcation improvement (closure/conversion) (FImp), gain of horizontal bone level (HBL) and attachment level (HCAL). Secondary outcomes were gain in vertical attachment level (VCAL), probing pocket depth (PPD) reduction, PROMs and adverse events. Data were summarized into Bayesian standard and network meta-analysis in order to estimate direct and indirect treatment effects and to establish a ranking of treatments.

Results: The search identified 19 articles, reporting on 20 RCTs (19 on class II, 1 on class III furcations) with a total of 575 patients/787 defects. Tooth loss was not reported. Furcation closure ranged between 0% and 60% (10 trials), and class I conversion from 29% to 100% (six trials). Regenerative techniques were superior to OFD for FImp (OR = 20.9; 90% CrI = 5.81, 69.41), HCAL gain (1.6 mm), VCAL gain (1.3 mm) and PPD reduction (1.3 mm). Bone replacement grafts (BRG) resulted in the highest probability (Pr = 61%) of being the best treatment for HBL gain. Non-resorbable membranes + BRG ranked as the best treatment for VCAL gain (Pr = 75%) and PPD reduction (Pr = 56%).

Conclusions: Regenerative surgery of class II furcations is superior to OFD. FImp (furcation closure or class I conversion) can be expected for the majority of defects. Treatment modalities involving BRG are associated with higher performance.

KEYWORDS

furcation defect, meta-analysis, periodontal regeneration, periodontitis, systematic review

Jepsen and Gennai contributed equally to this work.

(51)