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Bölüm 1

BAĞ DOKU VE BAĞ DOKU GREFTLERİ

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GİRİŞ

Ana görevi dişleri çene kemiklerine bağlamak ve ağız boşluğunun çiğneyici mukozasının yüzey bütünlüğünü korumak olan periodonsiyum 'bağlantı organı' ya da 'dişlerin destekleyici dokuları' olarak da adlandırılır. Yaşla birlikte belirli değişikliklere uğrayan ayrıca ağız içindeki değişikliklere bağlı olarak morfolojik değişikliklere maruz kalan gelişimsel, biyolojik ve fonksiyonel bir birim oluşturmaktadır (1). Periodonsiyumu oluşturan 4 unsur; diş eti, alveol kemiği, periodontal ligament (PDL) ve sementtir. Periodontal dokular dişlerimizin fonksiyonlarını sürdürmesinde ve destekte önemli bir rol oynar. PDL, sement ve alveol kemiği dişlerimize uygulanan baskılara tepki olarak hayatımız boyunca yeniden şekillenmeye devam eder. Periodontal dokuların bir kısmı ağız boşluğunda açıkta olduğundan enfeksiyonlara karşı hassastırlar bu da yaygın olarak görülen gingivitis olarak karşımıza çıkmaktadır. Bu iltihaplanmalar diş eti çekilmesi gibi periodontal dokuların tahrip olmasına yol açabilir. PDL'nin yok edilmesi, periodontal cebin oluşması alveol kemiğin kaybına kadar gidebilir. Periodontal dokulardaki tahribat geri döndürülemez olabilir. Çünkü bu dokuların onarım ve yenileme yetenekleri çok azdır. Bu nedenle periodontal dokuların yenilenebilmesini sağlayabilmek için öncelikle bu dokuların fizyolojisi ve gelişim mekanizması çok iyi bilinmelidir (2). Diş eti çekilmeleri, diş eti hastalıkları ve periodontal rejenerasyonun sağlanabilmesi için serbest greftler, pedikül flepleri veya kök yüzeylerini kaplamak için yönlendirilmiş doku rejenerasyonunun kullanımı dahil olmak üzere çeşitli cerrahi teknikler önerilmiştir (19).

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Bölüm 2

ÇÜRÜKSÜZ SERVİKAL LEZYONLARDA PERİODONTAL TEDAVİ YAKLAŞIMLARI

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GİRİŞ

Gingival marjin, sağlıklı dişte mine-sement birleşiminin (MSB) 1-2 mm koronalinde yer alır.(1) Dişeti çekilmesi ile birlikte gingival marjin apikale göç eder.(2) Dişeti marjininin apikal yönde olan hareketi ile MSB açığa çıkar ve bu durum hastada estetik şikayetler ve hassasiyete sebep olur.

Dişeti çekilmesi yaygın bir klinik tablodur ve 50 yaş üstü popülasyonun neredeyse tamamını etkiler.(3) Etiyolojisi multifaktöriyel olup anatomik, fizyolojik ve patolojik faktörlerle ilişkilendirilebilir.(4) Anatomik faktörlere dişi çevreleyen kemikte fenestrasyon veya dehisens bulunması, dişin alveolar kretteki anormal pozisyonu, dişin ektopik sürmesi veya dişte şekil anomalisi bulunması(5), alveolar mukoza kalınlığında yetersizlik(6); fizyolojik faktörlere dişin ortodontik kuvvetler sonucu alveolar kemiğin bukkal veya lingual/palatinalinde konumlandırılması(7, 8); patolojik faktörlere hatalı diş fırçalama ve diş ipi kullanımı, piercing, maloklüzyon ve oklüzal travma, kötü dizayn edilmiş restorasyon ve protezler, bakteriyel plak ve periodontal hastalıklar örnek gösterilebilir.

Dişeti çekilmesi olan hastalarda estetik kaygıyı ve kök yüzeyindeki hassasiyeti gidermek ve keratinize doku oluşturmak amacıyla çekilme defektinin tedavi edilmesi gerekir. Defektin kapatılması için önerilen kök kapatma prosedürleri kök yüzey abrazyonu/çürüğü varlığında ve dişeti marjininin uyumsuzluğunda uygulanmaktadır.(9, 10)

Kök kapatma prosedürleri kapsamında koronale pozisyone flep (KPF), laterale pozisyone flep, semilunar flep, çift papilla flep gibi saplı flepler, serbest

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miktarına negatif etkisi olmadığı kanıtlanmıştır.(53, 54) Servikal lezyonun tamamıyla restore edilmesi fikrinin yanı sıra literatürde lezyonun sadece koronal kısmının restore edilmesi gerektiği yani restorasyonun apikal sınırının MSB'de olması gerektiği de savunulmaktadır.(31, 34) Bunun sebebi restorasyonun başarısız olduğu durumda yenilenmesi için tekrar cerrahi operasyon gereksiniminin önüne geçmektir.(14) Bununla birlikte, tam kök kapanma gerçekleşmediği durumda rezidüel ekspoz kök riskinin önüne geçmek için restorasyonun apikal sınırının MSB'nin 1 mm apikalinde olması gerektiğini söyleyen çalışmalar mevcuttur.(14, 31, 55) Ancak restorasyon bitiş sınırını kıyaslayan çalışma bulunmamaktadır.

Restorasyonun cerrahi öncesi veya cerrahi esnasında yapıldığı farklı çalışmalar bulunmakta olup restorasyonu cerrahi öncesinde yapmak seansın süresini kısaltacağı gibi restorasyonun ve operasyon bölgesinin kontaminasyon riskini de azaltır.(14)

SONUÇ

Dişeti çekilmesi çoğu zaman dişin servikalinde oluşan sert doku kaybı yani ÇSL ile ilişkilidir. ÇSL tedavisinde kesin bir protokol mevcut değildir. Bu lezyonların önlenmesi, takip edilmesi ve gerektiğinde tedavi edilmesine yönelik birtakım önerilerde bulunulmuştur. MSB'nin ortadan kaybolması ÇSL'nin teşhis, tedavi ve prognozunun değerlendirilmesinde zorluklara sebep olur. MSB, ÇSL'nin ve bölgeye uygulanacak restorasyonun sınırlarının belirlenmesi için referans sağlar. ÇSL sadece kronu içeriyorsa restoratif tedavi, sadece kökü içeriyorsa periodontal tedavi endikedir. Fakat klinik şartlarda genellikle ÇSL'nin hem kronu hem de kökü etkilediği daha komplike vakalarla karşılaşılır. Bu durumun tedavisi için kombine restoratif/periodontal tedavi yaklaşımlarının uygulanması gerekmektedir. Ancak ÇSL nedeniyle kaybolan MSB'nin tespiti oldukça zordur ve önerilen kombine tedavi protokolleri deneysel düzeydedir. ÇSL kombine tedavisine, MSB tespitine ve farklı restoratif yaklaşımların kıyaslanmasına yönelik ileri çalışmalara ihtiyaç vardır.

Kaynakça

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Bölüm 3

DİYABET PERİODONTİTİS İLİŞKİSİ VE GÜNCEL TEDAVİ YAKLAŞIMLARI

Bilkan KARA[1]

GİRİŞ

Diabetes mellitus (DM), uzun yıllardır periodontal hastalıklar için önemli bir risk faktörü olarak kabul edilmiştir ve periodontitisin önemli ölçüde daha yüksek prevalansı ve şiddeti ile ilişkilendirilmiştir (1). Daha yeni veriler, kronik hiperglisemi ile şiddetli periodontitisin yüksek prevalansı arasında anlamlı bir ilişki olduğunu doğrulamıştır. (2,3). Bu kanıt özellikle tip 2 DM'nin etkilerine odaklansa da, etki tip 1 DM'de daha az araştırılsa da benzer görünmektedir (4–6). DM ciddi bir halk sağlığı sorununu temsil etmekte ve etkilenen popülasyonun kapsamı açısından periodontitisi etkileyen açık ara başlıca sistemik hastalıktır. Ek olarak, periodontal inflamasyonun kendisinin hipergliseminin başlamasına ve devam etmesine katkıda bulunabileceğine dair kanıtlar bulunmaktadır, çünkü inflamasyon DM'li bireylerde daha zayıf glisemik kontrol ile ilişkilidir ve uzun dönem prospektif çalışmalarda DM vakalarında bir artış ile ilişkili olabilir (7).

1) DİABETES MELLİTUS'UN PERİODONSİYUM ÜZERİNE ETKİSİ:

Hem tip 1 diabetes mellitus hem de tip 2 diabetes mellitus, insan periodontal dokularında inflamatuar sitokin ekspresyonunda bir artışa yol açar (8–10). Örneğin, interlökin-1 beta ve prostaglandin E2'deki artışlar, hem tip 1 diabetes mellitus hem de tip 2 diabetes mellitus deneklerinin dişeti oluğu sıvısında bulunur (11,12). Çeşitli araştırmalar, diyabetik insanların diş etlerinde veya diyabetik hayvan modellerinde tümör nekroz faktörü, interlökin-1beta, interlökin-17, interlökin-23 ve interlökin-6 ekspresyonunun arttığını bildirmiştir (13). Enflamatuar sitokinlerin artan ekspresyonu, artmış rezorpsiyonu uyararak daha büyük RANKL veya azalmış osteoprotegerin ekspresyonu ile birlikte artmış vasküler geçirgenliğe ve inflamatuar hücrelerin toplanmasına yol açmaktadır (13).

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SONUÇ

Diabetes mellitus, kusurlu insülin üretimi, insülin direnci veya her ikisi ile ilişkili hiperglisemi ile karakterize bir metabolik bozukluk grubudur. Özellikle uzun süreli hiperglisemi diyabet komplikasyonlarına yol açmakta ve bu komplikasyonlar tüm diyabet tipleri için benzer olmaktadır. Diyabetik komplikasyonlar sıklıkla artan inflamasyonla bağlantılıdır. Diyabetli yetişkinlerin çoğunda görülen periodontal hastalık da diyabetin bir komplikasyonudur ve diyabet periodontitisin önemli ölçüde daha yüksek prevalansı ve şiddeti ile ilişkilendirilmiştir. Aynı zamanda çalışmalar periodontitis şiddetinin glisemik kontrolü etkildiğini de bildirmiştir. Dolayısıyla diyabet-periodontitis ilişkisi çift yönlüdür.

Anti-diyabetik ilaçlar olan metformin ve sülfonilürelerin anti-enflamatuar etkileri ve kemik metabolizmasını pozitif yönde etkileyebileceği çalışmalarda gösterilmiştir. Aynı zamanda metforminin jel formu lokal olarak kullanılmış ve kemik içi ceplerde kemik dolumu elde edilmiştir.

Diyabetli periodontitis hastalarının tedavisinde güncel olarak sistemik antimikrobiyaller yaygın olarak kullanılmaktadır. Aynı zamanda antimikrobiyalların topikal formları da başarılı sonuçlar vermiştir. Konak modülasyon ajanları olarak subantimikrobiyal doz doksisiklin hakkında farklı çalışmalar farklı sonuçlar bildirmiştir. Omega-3 çoklu doymamış yağ asitleri kullanımında klinik parametrelerde pozitif sonuçlar bulunmuştur. Ancak hiçbir konak modülasyon ajanı glisemik kontrole ek pozitif etki sağlamamıştır. DM'li periodontitis hastalarının cerrahi olmayan tedavisine ek olarak lazerlerin kullanımı araştıran çalışmalarda da çelişkili sonuçlar bulunmuştur. Diyabet ile periodontitis arasındaki karşılıklı ilişki sebebiyle periodontal tedavi önem kazanmış olup bu konuda yapılacak daha ileri çalışmalara ihtiyaç duyulmaktadır.

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Bölüm 4

PERİ-İMPLANT YUMUŞAK DOKU YÖNETİMİNDE KOMPLİKASYONLAR

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GİRİŞ

İmplantları çevreleyen yumuşak dokuya peri-implant mukoza denir. Peri-implant mukozanın özellikleri, implant yerleştirilmesini takip eden yara iyileşme sürecinde veya protetik aşamadan sonra belirlenir. İmplant çevresinde transmukozal ataşman oluşumunun yumuşak doku sızdırmazlığını sağladığı, ağız boşluğundan gelen toksik ürünlerin kemik dokusuna ulaşmasını önlediği, dolayısıyla implantın osseointegrasyonu ve rijit fiksasyonunu sağladığına inanılmaktadır. Bu kavram, giderek daha fazla yumuşak dokuların doğru yönetimine yönelinen dental implantolojinin temelidir (1-3).

Cerrahi yumuşak doku yönetimi, implant tedavisi sırasında farklı zamanlarda yapılabilir ve implantın yerleştirileceği bölgeye göre farklı amaçlara sahip olabilir. Cerrahi teknikler keratinize doku yüksekliğini arttırmayı amaçlayanlar ve dokuların kalınlık/hacimlerini arttırmayı amaçlayanlar olarak iki ana kategoriye ayrılabilir. Keratinize doku genişliğini artırmaya yönelik tekniklerin amacı, vestibül derinliğini artırarak hastanın evde bakımını ve plak kontrolünü iyileştirmek, yapışık keratinize doku elde etmektir. Bu teknik genellikle estetiğin endişe kaynağı olmadığı posterior bölgede gerçekleştirilir (4-7).

Yumuşak doku kalınlığını artırmaya yönelik tekniklerin amacı, kret tepesinden mukogingival sınıra kadar kalınlığı ve yüksekliği artırarak peri-implant yumuşak dokuları oluşturmak veya eski haline getirmektir; bu dokular, protetik restorasyonun doğal çıkış profilini oluşturmak ve tatmin edici bir estetik sonuç elde etmek için oldukça önemlidir. Bu teknikler genellikle estetiğin endişe kaynağı olduğu anterior bölgede gerçekleştirilir (8-10).

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için uygulanan mukogingival prosedürlerin başarısı için kritik faktör interproksimal yumuşak dokuların varlığıdır.

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Bölüm 5

PERİODONTAL HASTALIĞI OLAN BİREYLERDE ORTODONTİK TEDAVİLER

Özlem SARAÇ ATAGÜN[1]

GİRİŞ

Periodontitis, dişi destekleyen dokuların ilerleyici yıkımı ile karakterize, periodonsiyumun iltihabi bir hastalığıdır (1). Periodontitisin etiyolojisi multifaktöriyeldir. Subgingival dental biyofilm, konakçıda enflamatuar ve immün yanıt oluşturarak, duyarlı bir konakçıda periodonsiyumun geri dönüşü olmayan bir şekilde tahrip olmasına yol açar. Periodontitisin başarılı bir şekilde yönetilebilmesi için diş hekimleri patogenezi, primer etiyolojiyi, risk faktörlerini, katkıda bulunan faktörleri ve tedavi protokollerini anlamalıdır. Periodontitisin başarılı bir şekilde önlenmesi ve tedavisi için dikkatli teşhis, nedenlerin ortadan kaldırılması ve değiştirilebilir risk faktörlerinin azaltılması çok önemlidir (2).

PERİODONTAL HASTALIKLAR VE ORTODONTİK TEDAVİLER

Evre IV periodontitis, periodontal ataçman kaybı, cep oluşumu, kemik defektleri ve olası patolojik diş migrasyonu ile karakterizedir. Bu periodontal durum, çiğneme disfonksiyonu, sekonder oklüzal travma, kapanış kollapsı ve kalan dişlerin sürüklenip açılması ve diş kaybı riski nedeniyle karmaşık multidisipliner rehabilitasyon gerektirir (3). Ortodontik tedavi, göç etmiş dişlerin yeniden hizalanmasına ve dişsiz boşlukların dağıtılmasına yardımcı olabilir. Ortodontik tedavi sırasında periodontal enflamasyon kontrolsüz kalırsa, bu durum periodontal yıkımın ilerlemesini hızlandırarak daha fazla ataçman kaybına yol açacaktır (4).

Agresif periodontitis de, yoğun kemik kaybı nedeniyle erken diş kaybına yol açabilen önemli bir periodontal hastalıktır (5). Agresif periodontitisin klinik belirtileri arasında diastema, rotasyon, ekstrüzyon ve proklinasyon olup orta ila şiddetli periodontitisli hastaların %30 ila %50'sinde görülür. Dahası, birçok hasta

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Bölüm 6

PERİODONTAL REJENERASYON VE REJENERATİF TEKNİKLER

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PERİODONTAL REJENERASYON VE İYİLEŞME

Periodontal Rejenerasyon

Periodonsiyum, iltihaplanma veya cerrahi tedavinin bir sonucu olarak hasar gördüğünde, defekt, periodontal rejenerasyon veya onarım yoluyla iyileşir. Periodontal rejenerasyonda, fonksiyonel olarak hizalanmış alveolar kemiğin oluşumunu içeren yeni bir periodonsiyumun yeniden oluşturulması yoluyla iyileşme gerçekleşir. Alternatif olarak, çeşitli işlevsel olmayan skar dokusu türlerine olgunlaşan epitelyal ve/veya bağ dokusu ile değiştirilerek iyileşmeye bağlı onarım, yeni ataçman olarak adlandırılır. Histolojik olarak, onarım paternleri uzun birleşim epiteli, ankiloz ve/veya yeni ataçmanı içerir. Periodontal onarımın stabilitesi net olmasa da periodontal cerrahi tedavinin ideal amacı periodontal rejenerasyondur. (1)

Rejenerasyon, kaybolan dokuların, tahrip olan yapıların orijinal mimarisi ve işlevi tamamen restore edilecek şekilde yeniden oluşturulması olarak tanımlanmaktadır. Rejeneratif periodontal tedavinin temel amacı, alveolar kemik, kök sementi ve periodontal ligament dahil olmak üzere periodontitis nedeniyle hasar gören periodonsiyumun anatomisini ve işlevini yeniden oluşturmaktır. (2)

Periodontal Yara İyileşmesinin Değerlendirilmesi

Klinik ve deneysel durumlarda rejenerasyonun veya yeni bağlanmanın olup olmadığını ve ne ölçüde gerçekleştiğini belirlemek bazen zordur. Çeşitli rekonstrüksiyon kanıtları olmasına rağmen iyileşme tipinin prensip kanıtı

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dokuların öncelikli olduğunu anlamak üzere yapılan yoğun çalışmalar, yeni ataşman sağlanmasında kök yüzeyi özelliklerinin önemli olduğunu ancak yara bölgesinde çoğalacak hücrelerin tipinin yara iyileşmesinin türünü belirleyeceğini göstermektedir. Periodontal rejenerasyon meydana getirme yeteneğindeki hücrelerin ise ancak periodontal ligament kaynaklı hücreler olabileceği yolunda kuvvetli deliller elde edilmiştir.

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Bölüm 7

PERİODONTOLOJİDE TROMBOSİTTEN ZENGİN FİBRİN KULLANIM ALANLARI

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GİRİŞ

Periodontal tedavinin amacı, inflamasyonu gidererek yıkımı durdurmak, hastanın oral hijyenini sağlayacak bir ortam oluşturmaktır. İdeal hedef, periodontal rejenerasyondur; bu, yeni kemik ve sement oluşumu ile periodontal ligament fibrillerinin düzenlenmesiyle gerçekleşir. Geleneksel tedaviler genellikle sınırlı doku oluşumu sağlar. Ancak son yıllarda, rejeneratif cerrahilerle periodontal cep derinliğini azaltan bariyer membran ve greft malzemeleri kullanımı artmıştır (1,2).

Rejeneratif tedavinin başarısı, moleküler ve hücresel olayların anlaşılmasına bağlıdır. Gelişim ve rejenerasyon süreçlerinde hücrelerin migrasyonu, ataşmanı ve farklılaşması gibi benzer olaylar gözlemlenir. Cerrahi sonrası pıhtı oluşumu, iyileşme sürecini başlatır. Periodontal dokuların gelişimi ve rejenerasyonu için kritik olan faktör, uygun hücrelerin gelişim ve tamir alanına çekilmesidir (3).

Son yıllarda, yönlendirilmiş doku rejenerasyonu için indüktif materyaller kullanılmaktadır. Ayrıca, hastanın kendi kanından elde edilen trombosit konsantrasyonları, yüksek büyüme faktörü içeriğiyle periodontolojide önemli bir yere sahip olmuştur. Bu bölümde, trombositten zengin fibrinin (PRF) periodontolojideki kullanım alanları ele alınacaktır.

TROMBOSİTTEN ZENGİN FİBRİN

Trombositler, kanın pıhtılaşmasını sağlayarak aşırı kan kaybını önleyen renksiz ve çekirdeksiz hücre parçalarıdır. Büyüklükleri 1-3 mikron arasında değişir ve sağlıklı

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hastanın kendi kanından elde edilen otojen bir biyomateryal olması, yan etki oluşturmaması ve uygulama kolaylığı açısından kullanılabilir bir yöntem olduğu görülmektedir.

Mevcut literatürler rehberliğinde ve yapılan çalışmalarda PRF kullanımı umut vericidir. Kullanım alanının yaygınlaşması için uzun takip dönemine sahip randomize kontrollü klinik çalışmalara gereksinim vardır.

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Bölüm 8

DİŞ HEKİMLİĞİNDE PROBİYOTİK KULLANIMI

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1. PROBİYOTİKLER

1.1. Probiyotik Tanımı

Probiyotik terimi, Yunanca "pro" (için) ve "bios" (yaşam) kelimelerinden türetilmiş olup "yaşam için" anlamını taşımaktadır (1). 1908 yılında Nobel ödüllüne layık görülen Elie Metchnikoff, Bulgar halkının neden daha uzun bir yaşam sürdüğünü incelemiştir. Araştırmaları sırasında, bu durumun yaşam tarzlarına bağlı olabileceğini fark etmiş ve özellikle fermente süt ürünleri tüketiminin belirgin bir fark yarattığını gözlemlemiştir. Çalışmaları sonucunda Lactobacillus Bulgaricus (L. Bulgaricus) adlı bakteriyi keşfetmiş ve bu buluşuyla probiyotik kavramının temellerini atmıştır (2, 3).

Lilly ve Stillwell, 1965 yılında probiyotikleri diğer mikroorganizmaların büyümesini destekleyen ve mikroorganizmalar tarafından üretilen yapılar olarak tanımlamıştır (4). Fuller ise 1989 yılında probiyotikleri, bağırsak mikrobiyal dengesini koruyarak veya iyileştirerek insan sağlığına fayda sağlayan canlı mikrobiyal gıda katkıları olarak ifade etmiştir (5).

Dünya Sağlık Örgütü (WHO), 2002 yılında probiyotikleri "yeterli miktarda alındıklarında konağın sağlığına fayda sağlayan canlı mikroorganizmalar" olarak tanımlamış ve bu ifade, günümüzde probiyotik teriminin kabul gören tanımı haline gelmiştir (6).

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Bölüm 9

PERİODONTOLOJİDE LAZER UYGULAMALARI

Bilge KARCI[1]
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1. LAZER

1.1. Lazerin Tanımı

Lazer "Light Amplification by Stimulated Emission of Radiation" sözcüklerinin ilk harfleri alınarak oluşturulmuş "radyasyonun uyarılmış emisyonu ile ışığın güçlendirilmesi" anlamını taşıyan bir kelimedir (1). Lazer ışığı, doğal gazlar, elementler, moleküller ve çeşitli kristallerin atomlarının uyarılması sonucunda ortaya çıkan, yüksek yoğunlukta ve aynı dalga boyuna sahip elektomanyetik radyasyondan meydana gelir. Bu ışık paralel hareket eder (2).

1.2. Lazerin Tarihçesi

Lazerin tarihi, Albert Einstein'ın 1916 yılında bir maddenin uyarılması sonucunda radyasyon yayılabilme konseptini ortaya atmasıyla başlamaktadır (3). Einstein, 1916'da "uyarılmış emisyon" kavramını ortaya attığı bir makale yayınlamıştır, ancak bu teorik bir çalışmadır ve pratik bir uygulama içermez. Daha sonra, 1951'de Charles H. Townes, Alexander Prokhorov ve Nikolai G. Basov, ilk mikrodalga amplifikasyonunu sağlayan cihaz olan MASER'i (Microwave Amplification by Stimulated Emission of Radiation- Radyasyonun Uyarılmış Emisyonuyla Mikrodalga Yükseltme) geliştirdiler. Bu çalışma, bilim adamlarına 1964 yılında Nobel Ödülü'nü kazandırdı (4).

Theodore Maiman tarafından ABD'nin California eyaletinde bulunan Hughes Araştırma Laboratuvarları'nda, 1960 yılında ilk kez başarılı şekilde çalıştırılan

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c. Waterlase C 100: Tam, kısmi ve yarı kalınlıkta flep, yumuşak doku küretajı, periodontal cep içindeki hastalıklı, enfekte, iltihaplı, nekrozlu yumuşak dokunun çıkarılması, osteoplasti, kemik yeniden şekillendirme, osteotomi ve kemik kron uzatma gibi uygulamalarda endikedir.

Hedef uygulama: Restoratif prosedürler, çekim, erken periodontal tedavi

d. Fotonla indüklenen fotoakustik akım: DiVito EE tarafından geliştirilen, subablative seviyelerde güçlü şok dalgaları oluşturarak dezenfekte edici sıvılarla birlikte tüm kök kanal sistemi boyunca üç boyutlu olarak temizlik yapmak için yeni bir gelişme

e. Piezosurgery: Ultrasonik titreşim kullanan bir ultrason cihazıdır ve osteotomi ve osteoplasti gibi prosedürler için kullanılır. Ayrıca kök kanalı için retrograd hazırlık, çıkıntı artırma, çıkıntı genişletme, diş çekimi ve ortodontik cerrahilerde kullanılabilir.

f. Osseodensification: Diş implantı yerleşimi için kemik kütlesini koruyarak ve iyileşme süresini kısaltarak biyomekanik kemik hazırlama için yeni bir yöntemdir (42).

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