

Bölüm 3

BİR DEVRİM: NİKEL TİTANYUM EĞELERİNİN GELİŞİMİ

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GİRİŞ

Nikel-titanyum (NiTi) alaşımları piyasaya sürüldüklerinden beri endodonti alanında devrim yaratmaya devam etmiştir. Endodontik tedavilerde paslanmaz çelik eğeler kullanılırken, kanalda basamak oluşması, perforasyon gelişmesi gibi dezavantajlar bulunmaktadır. Bu nedenle kanal anatomisine uyum sağlayan NiTi içeriğinde enstrümanlar geliştirilmiştir. Mekanik özellikler açısından geleneksel paslanmaz çelik eğelere göre önemli avantajlara sahiptir. Artan esneklik özellikleri ve kısa tedavi süresi avantajı dışında, NiTi eğeler ayrıca süperelastiklikleri sayesinde daha güvenli preparasyon imkanı doğmuştur (1). 1990'lı yılların başlarında ilk NiTi döner aletler kullanılmaya başlanmıştır (2).

NİTi EĞELERİN TARİHÇESİ

Ni-Ti alaşımı, 1963 yılında W.F. Buehler isimli bir metalurjistin Amerikada bir uzay programı için geliştirmesiyle kullanılmaya başlanmıştır. Çalışmanın yapıldığı 'Naval Ordnance Laboratory' isimli laboratuvarın kısaltması yapılarak -Nitinol- adıyla tanıtılmıştır (3). Nikel titanyum alaşımları diş hekimliği alanında 1971 yılında Andreasen ve Hilleman tarafından ortodontik tel üretiminde kullanılmıştır. NiTi alaşımların ege üretimi amacıyla ilk kez 1975 yılında Civjan ile arkadaşları tarafından düşünülmüştür (4). Fakat asıl olarak NiTi aletler, 1988 yılında Walia ve arkadaşları tarafından geliştirilmiştir (5).

NİTi ALAŞIMLARININ İÇERİĞİ VE ÖZELLİKLERİ

Kullanılan NiTi alaşımları %56 nikel ve %44 titanyum içerir bu da neredeyse bire bir atomik oran (eş atomluluk) sağlar (6). NiTi alaşımlar, sıcaklık veya basınç

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rijit ve taperı yüksek eğelerle apikal baskı uygulanmamalıdır. Pathfile ve Proglider gibi döner eğeler veya küçük boyuttaki el eğeleri ile giriş yolu oluşturulmalıdır. Dar ve eğimli kanallarda düşük tapera sahip eğeler kullanılabilir. Ayrıca eğenin kırılmaya karşı direncini arttıran resiprokasyon hareketinin kullanıldığı gold ve blue wire gibi esnek ve şekil hafızalı eğeler kullanılabilir.

SONUÇ

İlk rejenerasyon eğeleri östenitik bir yapıya sahipken son rejenerasyon eğelerinin daha martensitik yapıda olduğunu söyleyebiliriz. Son nesil eğelerin kanal içinde merkezlenebilme yeteneği, kanal anatomisine sağladığı uyum ve şekillendirme etkinliği daha fazladır. Yapılan pek çok çalışma göstermektedir ki; martenzit yapıdaki NiTi alaşımları, östenit alaşımlardan daha yumuşaktır ve şekil hafızası özelliğine sahiptir (67). Günümüzdeki eğelerin artan martenzit faz yapısı nedeniyle, döngüsel yorgunluğa karşı gelişmiş bir dirençle daha esnektir ve daha büyük bir dönme açısına sahiptir. Ancak bununla birlikte daha düşük torkla torsiyonel yorgunluğa bağlı kırılabilirler. Birden fazla döner ege sisteminin anlatıldığı bu derlemenin; endodonti alanına katkı sağlayacağını ve yapılacak araştırmalara referans oluşturabileceğini düşünmekteyiz.

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