Bölüm 10

DİŞ HEKİMLİĞİ PRATİĞİNDE MİKRO BİLGİSAYARLI TOMOGRAFİNİN KULLANIM ALANLARI

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GİRİŞ

1895 yılında Rontgen tarafından x-ışınlarının bulunmasıyla birlikte non-invaziv olarak vücudun internal yapısını görmeyi sağlayan teknoloji, teşhise dayalı tıpta çok önemli bir gelişme olmuştur (1). Bilgisayarlı tomografi (BT), X-ışınının bilgisayar teknolojisi ile birleşmesinin sonucu olarak vücuttan kesitler şeklinde görüntü alınmasını sağlayan bir cihazdır (2). Medikal BT cihazları 1 mm3 hacimli voksellerden oluşmuş imajlar elde ederken; 1980'lerin başında geliştirilmiş olan ve 5-50 µm aralığında voksel üretimi yapan mikro bilgisayarlı tomografi (Mikro-BT) sistemleri, daha gelişmiş uzaysal rezolüsyona sahip görüntüler sunar (3).

Mikro-BT'nin genel yapısı medikal BT cihazlarına benzer. Mikro-BT cihazının ana parçaları bir X-ışını tüpü, belirli aralıklarla sabitlenmiş numuneyi belirli aralıklarla döndüren, bilgisayar kontrollü bir adım motoru, X-ışını kamera sensörüne yoğunlaştıran görüntü yoğunlaştırıcı ve X ışınlarını görüntü verilerine, görüntü toplayıcısına ve tüm bu işlemleri denetleyen bir bilgisayar üzerine dönüştüren bir CCD kameradır (4).

Tahribatsız bir yöntem olarak Mikro-BT, numuneye zarar vermeden 3 boyutlu bilgi sağlar ve radyografik görüntü bölümleri ile iç rekonstrüksiyona izin verir. Aynı numune daha sonra aynı doku alanlarına ait tamamlayıcı bilgiler üreten histolojik analiz için hazırlanabilir. Ek olarak, Mikro-BT kullanarak, mineral özellikleri gibi diğer parametrelere dayanarak kemik kalitesini ölçmek mümkündür. Ayrıca, temsili bir kemik hacminde analiz edilen mikro mimari, sadece histoloji yöntemlerinde verilen birkaç bölümde değil, farklı bölgeleri değerlendirecektir (5).Avantajlarının yanı sıra, uzun tarama süresi, Mikro-BT tekniğinin yüksek ma-

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niyofasiyal kemiğin Mikro-BT görüntüleri üzerinde elde edilebilmesi, trabeküler kalınlık, sayı ve seperasyon, kemik hacmi, total doku hacmi, trabeküler kemik hacmi fraksiyonu gibi morfolojik parametrelerin kantitatif 3D ölçümlerin yapılabilmesini mümkün kılmıştır (55).

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