

BÖLÜM 1

ORTODONTİK TEDAVİLERDE ÜÇ BOYUTLU (3D) APAREY TASARIMI VE ÜRETİMİ

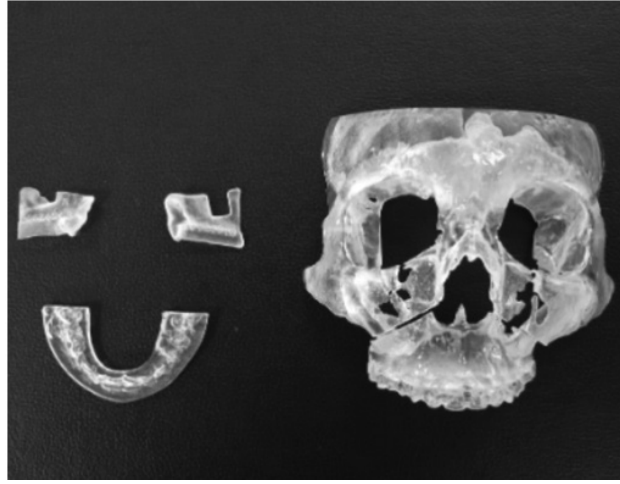
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GİRİŞ

Eklmeli imalat olarak da adlandırılan üç boyutlu (3D) baskı, dijital modellerden katı nesnelere üretmek için malzemeleri katman katman biriktiren bir süreçtir (1). Ekleme yöntemi 1980'lerde prototip, model ve döküm örneklerinin üretiminde kullanılmaya başlanmıştır. Bu nedenle tabaka ekleme üretimi kullanılarak modellerin hızlı üretimine “hızlı prototipleme (rapid prototyping)” adı verilmiştir. Günümüzde ekleme yöntemi; ön üretimden tam sistem üretimine, hatta şekillendirme ve üretim sonrası düzenlemeye kadar ürün döngüsünün her alanında kullanılabilen teknolojileri tanımlar (2). Charles Hull tarafından icat edilen ilk 3D yazıcının 1980'lerin ortalarında Amerika Birleşik Devletleri'nde piyasaya sürülmesinden bu yana, çeşitli 3D baskı süreçleri ve malzemeleri geliştirilmiştir (3). 3D baskının değere sahip olması için yazdırılacak nesnelere oluşturulması gerekmektedir; bu sebeple bilgisayar destekli yazılım programı denilen CAD yazılımı, sıfırdan nesnelere oluşturulmasını sağlar (4). CAD yazılımı, 3D görüntüleri oluşturur, değiştirir, analiz eder, işler ve yalnızca diş hekimliğinde değil, aynı zamanda mühendislik, havacılık ve mimaride de yaygın olarak kullanılır (5). Diş hekimliğinde, daha çok “frezeleme” olarak tanımlanan eksiltici imalat ile de üç boyutlu nesnelere üretilmektedir. Eksiltici imalat, bir nesne oluşturmak için blok halindeki malzemenin yontulmasıdır (6). Diş hekimliğinde 3 boyutlu materyallerin üretimi için doğruluk açısından, birçok çalışma, freze sistemini yeterli performansa sahip olduğunu bildirmiştir (7).

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Şekil 15: Ortognatik cerrahi planlanan hastanın 3D baskı modeli. Lefort I osteotomi klavuzu ve okluzal splinti (97)

SONUÇ

Klinik diş hekimliğinde ve özellikle de ortodontide 3D baskı uygulamaları için açıkça büyük bir potansiyel vardır. Bu durum, özellikle yazılım ve farklı fiziksel süreçlerde uzmanlaşma konusunda geleneksel yöntemlerden tamamen dijital bir iş akışına geçişi içeriyor olsa da, teknolojik gelişimlerle birlikte ortodontik kullanımlar için daha da yaygınlaşacağı şüphe götürmeyen bir gerçektir.

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