



Bölüm

2

ROBOTİK CERRAHİ TEKNOLOJİSİNİN GELİŞİMİ

Tuncer ÖZTÜRK¹

GİRİŞ

Teknolojik ilerleme nedeniyle, tıbbi robotların araştırılması ve geliştirilmesi, cerrahi operasyonlar da dahil olmak üzere tıbbi prosedürlerin gerçekleştirilme biçiminde devrim yarattı. Bu muazzam ilerleme, yalnızca aktüatörler, sensörler, kontrol sistemleri ve malzemeler dahil olmak üzere teknolojik ilerlemeye değil, aynı zamanda daha yüksek çözünürlükler ve manyetik görüntüleme gibi tıbbi uygulamalar için görüntüleme sistemlerinin büyümesine de atfedilebilir [1]. Robotik sistemlerin yardımıyla başarıyla gerçekleştirilen tıbbi prosedürlerin yaygın olarak kabul edilmesi, yarı otonom veya robot destekli bir prosedürle sadece bir robot tarafından gerçekleştirilen bir prosedürü uygulamak isteyen bireylerin sayısında artışa yol açmıştır. Bu da tıbbi robotik alanının hızla ilerlemesine yol açmaktadır.

Robotlar, genel olarak, belirli bir dizi basit veya karmaşık görevi insan yardımı ile veya yardımı olmadan gerçekleştirmek üzere programlanabilen makineler olarak tanımlanır. Robotik yardımı kullanmanın bir avantajı, hassasiyet ve doğruluk odaklı yüksek hızlı hareket gerektiren görevleri gerçekleştirmek için programlama yeteneğidir. Robotlar ayrıca kuvvet uygulaması gerektiren görevleri de yıpranmadan yerine getirebilirler. Yüksek bedel dahil robotik sistemlerin kullanımını ile ilgili dezavantajlardan bazıları, büyük uzay düzgün böyle öncesinde kullanıma [doktorlar ve klinik personeli olarak operatörleri eğitmek için, sık bakım

¹ Dr. Öğr. Üyesi, Giresun Üniversitesi Tıp Fakültesi, dr.tuncerozturk@hotmail.com.tr

Robotik alanı, teknolojinin hızlı ilerlemesiyle birlikte sürekli gelişmektedir. Buna rağmen, robotların tıpta uygulanması ancak son otuz yılda ortaya çıktı ve bu nedenle keşfedilmemiş bir alan olmaya devam ediyor. Şu anda birçok robotik sistem mevcuttur ve tıbbi prosedürlerde kullanılmaktadır, ancak bu sistemler hakkında henüz yeterli veri bulunmamaktadır. Ne olursa olsun, robotik sistemlerin tıp alanına girişinin, tıbbi prosedür yöntemleriyle birlikte tüm tıbbi alet ve robot endüstrisini önemli ölçüde etkilediği açıktır [66].

Hepsi olmasa da, şu anda mevcut olan robotik sistemlerin çoğu, yalnızca tıbbi prosedürler sırasında robotik yardım işlevi görür ve ek özellikler (el hareketlerini filtreleme veya kuvvet ölçekleme gibi) sağlayarak hastalar için bir kılavuz mekanizma veya güvenlik ağı görevi görür; ancak tam otomatik robotik cerrahi henüz mümkün değil. Gelecekte, cerrahların bulunmasına veya denetleyici bir role sahip olmasına gerek kalmadan ameliyat yapabilen Yapay Zeka ile çalışan robotik sistemler mevcut olabilir. Böyle bir örnek, Çin'deki Tsinghua Üniversitesi tarafından geliştirilen ve 2017'de Çin'in Tıbbi Lisanslama Sınavında (geçme kriteri—360/600) 456/600 puan alan Robot Xiaoyi'dir [1 , 24].

Tıbbi robotik sistemlerin, belirli bir sistemin faydasına ve avantajlarına karar veren üç temel teknolojiye sahip olduğu söylenebilir: görüntüleme teknolojisi, navigasyon teknolojisi ve yardımcı sistem. Monarch™ Platformu ve Ion Robot-Assisted Platform gibi yeni sistemlerde görüldüğü gibi, görüntüleme teknolojisinin geliştirilmesi, bu teknoloji prosedürler sırasında doğruluğu ve kayıt noktalarını geliştirdiğinden, mevcut robotik sistemlere önemli bir fayda sağlayacaktır [48].

Göz önünde bulundurulması gereken bir nokta, gen terapisi ve nanorobotik gibi çeşitli tıbbi ve teknolojik alanlardaki ilerlemeyle birlikte tedavi yönteminin ciddi değişikliklere uğrayabileceğidir. Tedavi yöntemlerini mümkün olduğunca kolay ve verimli hale getirmeye çalışıyoruz. Gelecekte, mevcut tıbbi robotik sistemleri geçersiz kılacak nanoteknolojinin gelişimi olabilir.

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