導入3D金屬列印到手術器具之研製

身障重建中心 ┃ 黃瓅瑩物理治療師、王世仁博士、俞文展、黃嘉怡

摘要

3D列印技術能滿足客製化需求及節省醫療器具研發成本，而其中金屬列印除了這些優點之外更能兼具模型強度，有直接製造出實用醫療用具的潛力。本院3D列印中心已累積數年3D列印經驗，希望擴大研究範圍至金屬列印，期能滿足更多醫療器具研發需求。本研究為了節省成本並製造出安全可靠的醫療器械，我們在設計階段主要考量專利、成本、實體評估以及臨床手術醫師評估等面向。計畫執行期間，我們以3D金屬列印做出改良過後的拉勾座，其形狀是傳統加工方式難以完成的，並且在交期與成本上極具競爭力。今年(2020)年初全球新冠肺炎大流行，為配合醫院防疫措施，調整部分計畫人力至防疫門把設計及列印，目前本院中正樓與思源樓所有病房皆已裝設防疫門把。藉由此次計畫，我們了解3D金屬列印市場價格、確立金屬列印時電腦模型調整的方式、也看到3D金屬列印在高單價小零件的競爭力。之後若有金屬加工不易、需要高強度且客製化器具之案例，3D金屬列印是很值得參考的製程。

關鍵字：3D列印、3D金屬列印、手術器具、新冠病毒

Abstract

3D printing technology has advantages of customization and reducing the cost of medical device development, moreover, the high strength nature of 3D metal printing makes it more suitable on surgical device fabrication. One of the goals of 3D Printing Center in Taipei Veterans General Hospital is to develop reliable surgical devices for various medical applications. We believe that 3D metal printing is an promising technology for this. To develop reliable surgical device with lower cost, we put concerns on patent, cost analysis, real model evaluation and surgeon feedback. We fabricated the improved part of retractor holder using 3D metal printing to avoid the difficulties of traditional manufacturing method. Indeed, we found 3D metal printing needs lower cost and lesser time than buying the original part directly. Covid-19 has been becoming pandemic around the world since the beginning of this year. Thus, we also devoted ourselves to the epidemic prevention. We had installed the 3D printed handle to reduce the touching on the handles in the wards. Through this study, we realized the cost of 3D metal printing, the way to adjust computer models for better printing result, and the advantages of the application of 3D metal printing on expensive small parts. In conclusion, we suggest considering 3D metal printing technology on following concerns: difficult to process by traditional manufacturing, high strength needed, or customization required.

Keywords: 3D printing, 3D metal printing, surgical device, COVID-19