

Original Article

In vitro Biomechanical Study of Pulvertaft Tendon Weaving Technique 在生物體外對 Pulvertaft 魚口式肌腱編織縫合法之生物力學的研究

Chi-Pan Yuen, Chi-Hung Yen, Hon-Bong Leung, Wing-Lim Tse, Pak-Cheong Ho, Leung-Kim Hung

Abstract

Background/Purposes: The outcome of tendon repair depends on the strength, which allows early active mobilization to achieve better function without rupture. The aims of this study are to assess quantitatively the biomechanical properties and relationship between the number of tendon weaving and suture method using Pulvertaft technique.

Results: We found that the load to failure was increased with increasing number of weaves and sutures. From 1-weave to 4-weave single suture samples, the peak load to failure was 9.5N, 19.7N, 37.5N, and 42.6N, respectively. Based on previous studies, wrist and finger tendons should withstand 1–8N on passive mobilization.

Conclusion: On active mobilization, finger tendon repair need to provide 34N for immediate mobilization. Therefore, irrespective of number of sutures, both 3- and 4-weave repairs could allow early mobilization biomechanically.

中文摘要

臨床肌腱修復的成果，其中一個決定性的因素在於已修復肌腱的強度是否足以應付術後的早期活動與康復。本文以生物力學的角度去研究 Pulvertaft 魚口式編織方法之魚口數目和縫合的數目以及肌腱強度之間的關係，目的為臨床手功能康復提供數據。拉伸實驗的結果顯示，肌腱的最大失效載荷會因為魚口數目和縫合數目的增加而有所增加。由 1 至 4 個魚口單縫合的最大失效載荷分別為 9.5N, 19.7N, 37.5N 和 42.6N。基於以往的研究，肌腱需要抵擋 1 至 8N 的載荷以應付保護性的肌腱活動。而主動性的肌腱活動更需要高達 34N 的載荷。所以在生物力學的層面，不論縫合的數目，3 至 4 個魚口的肌腱縫合便足以應付術後的主動性肌腱活動。

Keywords: *pulvertaft technique, tendon injuries, tendon repair*