

Conceptual Design for Ankle Rehabilitation Robot by Using Morphological Chart and Pugh Method

Abstract

Lateral ankle sprains are among the most common injuries in competitive sports and recreational activities according to studies. Ankle sprains accounted for 70% or more of all reported ankle injuries in high risks sports. However, ankle sprains often only partially treated and there are more than 40% of ankle sprains are recurrent. Even though the ankle rehabilitation treatment exists, but there are some limitations that relates to the current situations. Firstly, the cost for ankle rehabilitation treatments are high and may be a burden to the patients while the traditional rehabilitation treatment performance highly relies on a physiotherapist's experience and the manual training method makes physiotherapist exhausted. Therefore, ankle rehabilitation robot can help to solve these problems. Morphological Chart are used to generate the concept design while Pugh Method are used to choose the best design. Concept design A (4 DOF Pulley Driven Cable Based Parallel Mechanism Ankle Rehabilitation Robot) are chosen as the best design among 5 concept design due to its advantages in aspect of low cost, easy to use, high portability, high back drivability and fulfilment of ankle rehabilitation exercises.