Development of Ankle Exoskeleton Device With Complex Functions of Rehabilitation Assessment, Rehabilitation Guidance and Rehabilitation Exercise

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The traditional way of using manual assistance for rehabilitation can't satisfy the requirement of rehabilitation market due to limited number of rehabilitation therapists, high labor costs, and the fact that the rehabilitation effect is limited by the experience and level of rehabilitation therapists. Therefore, the role of wearable exoskeletons with assisted movement, good stability, standardized training, and controllable cost has become increasingly important in rehabilitation field. Current ankle exoskeleton devices only have the function of assisting rehabilitation exercise, but no functions of rehabilitation assessment and rehabilitation guidance, which can easily cause rehabilitation exercises for patients to be too much or not enough. Moreover, current rehabilitation assessments mainly rely on the experience of therapists, which is not accurately quantified and standardized enough and easily causes misjudgment. To overcome these limitations, through ingenious mechanical design, electronic design, and program design, I designed an innovative wearable ankle exoskeleton that integrates rehabilitation assessment, rehabilitation guidance, and rehabilitation exercise. It's easy to wear and use, can scientifically assess patients' rehabilitation status, can scientifically guide and assist patients in rehabilitation exercises, and can accurately act on each rehabilitation stage after ankle surgeries. This device has been designed to provide detailed and precise rehabilitation assessment, rehabilitation guidance, and rehabilitation exercise for each post-operative rehabilitation stage of ankle fracture surgery. Using the same methodology, the rehabilitation strategies for other ankle surgeries can also be designed and executed through my device.

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