

عنوان مقاله:

Distraction Osteogenesis in Oral and Maxillofacial Reconstruction Applications: Feasibility Study of Design and Development of an Automatic Continuous Distractor

محل انتشار:

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خلاصه مقاله:

Distraction Osteogenesis (DO) is one of novel techniques widely used in bone Reconstruction Applications (RA). Recently, DO method has got an important role in oral and maxillofacial RA; by using DO bone defects and skeletal deformities in different cranio-maxillofacial areas can be reconstructed, with better results and reduced effects in comparison to conventional methods. In DO by using a tension-stress principle, mechanical stimulations induce bone generation and biological responses of the tissue. A DO procedure starts with bone osteotomy and implementation of distractor, before proceeding with distraction, there is a latency period which allows the callus to form initially. In the distraction phase, the generated external force goes through the moving bone segment and gradually distract the callus. After distraction phase, there is a consolidation phase and then the device is removed. Most of current DO methods are applied by manual devices; low accuracy and reliability, discontinuous force, manually-operated, and associated problems for patient are major disadvantages of manual devices. Recent studies have revealed using an automatic continuous distractor could significantly improve the DO results while decreasing the existing problems. The purpose of this study is to design and simulate a novel automatic continuous distractor to be used in DO applications. The device contains mini stepper motor and gear-box, controller, mechatronic system, LCD, and keypad. Design's specification and simulations results show this device has the capability to generate a continuous distraction force for a successful automatic DO.

کلمات کلیدی:

Automatic continuous controller, Distraction osteogenesis, medical devices

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