

基于柔性印刷工艺的表面肌电电极阵列装置的设计

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摘要：

设计了一种基于柔性印刷工艺的表面肌电电极阵列装置。该电极阵列由12个直径1.2mm的镀金圆电极分成两列组成，内部电极间距为3mm。电极载体材料（聚酰亚胺，厚50 μm ）具有较高的机械柔性，表面镀金（厚度2 μm ）的电极具有较低的阻抗，特制的聚酯双面胶带用于可重复使用的电极阵列装置的固定。在单指力量输出任务时记录指浅屈肌的多通道表面肌电（surface Electromyogram, sEMG）信号的实验中得到了稳定的基线和较好的sEMG信号。初步的实验结果表明，本文设计的这种低成本、体积小的高密度电极阵列装置能用于表面肌肉空间sEMG信号的检测。

关键词：电极阵列；柔性印刷工艺；多通道表面肌电信号；均方根；神经肌肉单元

Design of Electrode Array Device for sEMG Based on Flexible Printed Technology

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Abstract:

An electrode array device which noninvasively records sEMG was designed based on flexible printed technique. The electrode array consisted of twelve electrodes arranged as two columns, whose electrodes were made of circular gold-coated contacts of 1.2mm diameter, with an inter-electrode distance of 3mm. The material (Polyimide, 50 μm thick) used as electrode carrier allows this new sensor to own higher mechanical flexibility; electrodes with gold-coated (2 μm thick) surface have a lower resistance; And adhesive electrode array is attached to the skin using specially prepared double sided adhesive tape whose was made of acrylic polymer. In the experiment of multichannel sEMG recorded from Flexor Digitorum Superficialis (FDS) during single-digit force production tasks had acquired stable baseline and best sEMG signals. These preliminary results imply that the inexpensive and small in size high-density electrode array device could be applied in the recording of spatial information of sEMG over the surface muscles.

Keywords: Electrode array; Flexible printed technology; Multichannel surface Electromyography; Root Mean Square; Neuromuscular compartment

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