Biomedical Engineering for Clinical Research

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ABSTRACT - Biomedical Engineering now spans many different areas of clinical research. Before bioengineering came into being as a recognized discipline there were many developments in instrumentation, analysis, and technologies that used engineering and engineering tools in aid of clinical care and clinical research. Physiological instrumentation was prominent: making quantitative measurements advanced knowledge and led to applications in diagnosis and therapy. The engineering of systems for the delivery of anesthesia, for catheterization, for electrical signal acquisition, and for dialysis of body fluids required engineering rather than biological insight. These paved the way for the use of engineering analysis of biological and clinical data, for example time series analysis, and then for modeling analysis of data of simple and then of complex integrated systems. Nowadays, bioengineering contributes deeply to medical imaging, artificial organs, bioinformatics, pharmacokinetics, and artificial biomaterials. New developments are occurring in tissue engineering, home health care via computer-aided diagnosis and therapy, miniaturization and control of drug delivery systems, and in assessing patient status through non-invasive observations and minimally invasive chemical analysis.

KEY WORDS - clinical diagnosis, control of therapy, instrumentation, engineering analysis