

Outpatient and Accident-Emergency Departments

- These Departments constitute the major interface between the society in general, and the modern Hospital.
- These Departments act as the input gates into the Hospital structure.
- They receive patients under different constraints and with different needs; hence they apply different approaches.

The Outpatient Department



The Outpatient Department: Mission

- The main task of the *Outpatient Department* is to perform a diagnosis in complicated cases and to provide treatment wherever this is feasible.
- Critical points here are, the mutual interaction of the Outpatient Department and the other Hospital Departments, through the Hospital or Community Network.
- A crucial problem in this context is the mode of establishing *criteria* which are employed in the selection of the data and the reasons, which might have a bearing on both the diagnosis and the subsequent therapeutic intervention.

General planning aspects

- The main activities in an out-patient department are the reception, consultation, undressing, clinical examination, diagnostic tests, minor procedures, dressing and instruction of patients.
- The facilities should be planned so that:
 - ◆ *Easy accessibility even of handicapped persons is ensured.*
 - ◆ *Dignity and privacy of the patient is respected.*
 - ◆ *Functional flexibility of the department is provided.*

Functional elements

- Three functional zones are distinguished: *Public zone* (entrance lobbies, waiting areas, etc.), *joint use zone* (reception areas, examination rooms) and the *staff zone*.
- *Sign-posting*, that is, a systematic arrangement of visual signals to help the individual to reach a particular destination, is extremely important for the out-patient department.
- *Pictographs and color-marking* are suitable, because these can transcend the language and education barriers.

Consultation and examination/treatment suites

Consultation and examination/treatment suites must allow for multi-functionality of use. Therefore, some standardization should be adopted.

- ◆ *An area of about 12 - 20 m² is necessary and it should be elementary equipped with following items:*
- ◆ *Desk, a Dictaphone, a desk telephone, 3 chairs, and approx.. 4 m of bookshelves.*
- ◆ *An X ray viewing screen, an examination couch 190 cm x 60 cm x 75 cm (height), an adjustable lamp (halogen, 250 lux), an instrument trolley, an upright chair.*
- ◆ *Changing cubicles or curtains, clothes hooks, mirror, washbasin, soap & towel dispenser.*

Easy access



Sign-posting



Functional waiting area



Examination/treatment room

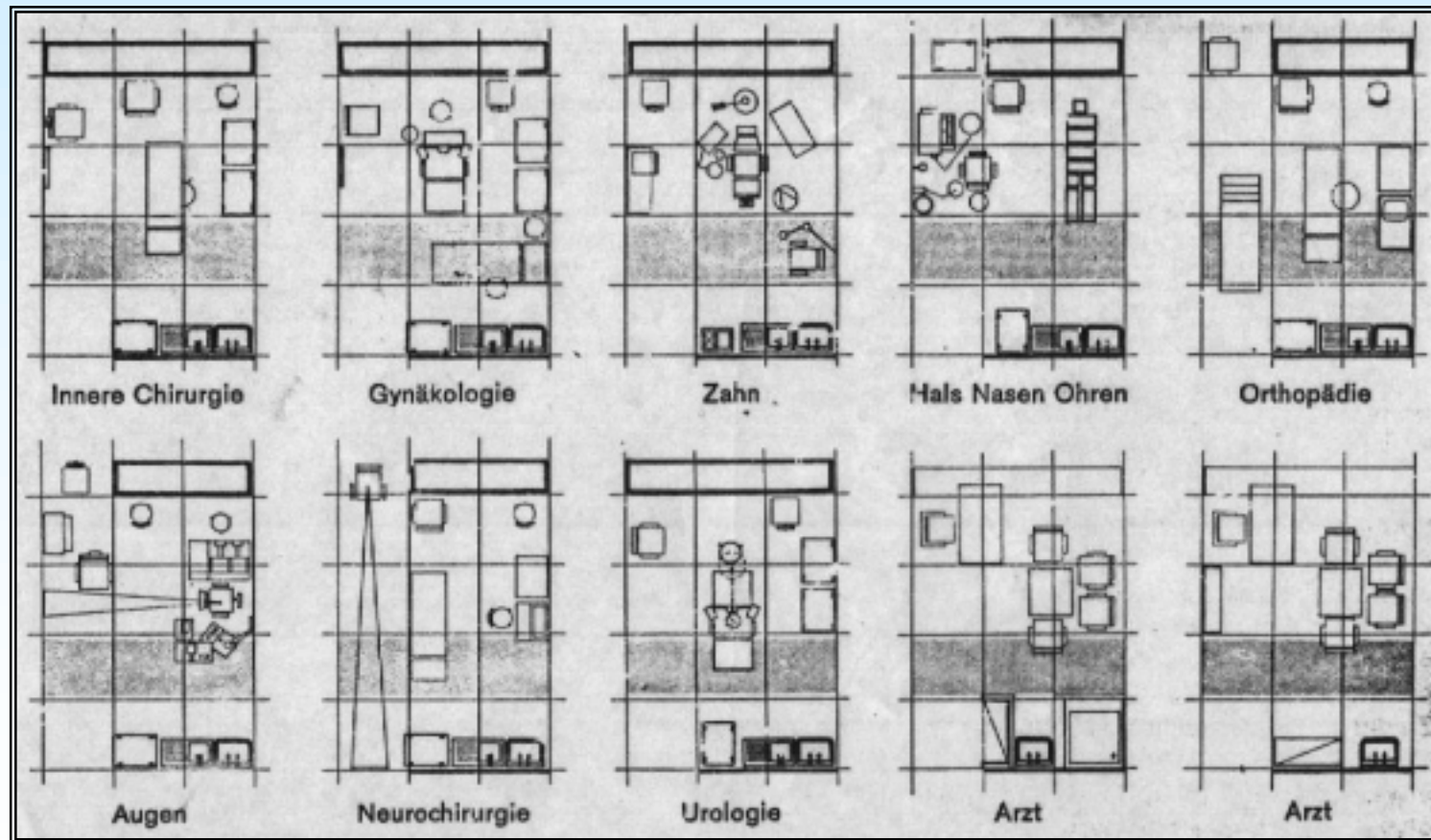


Biomedical Equipment

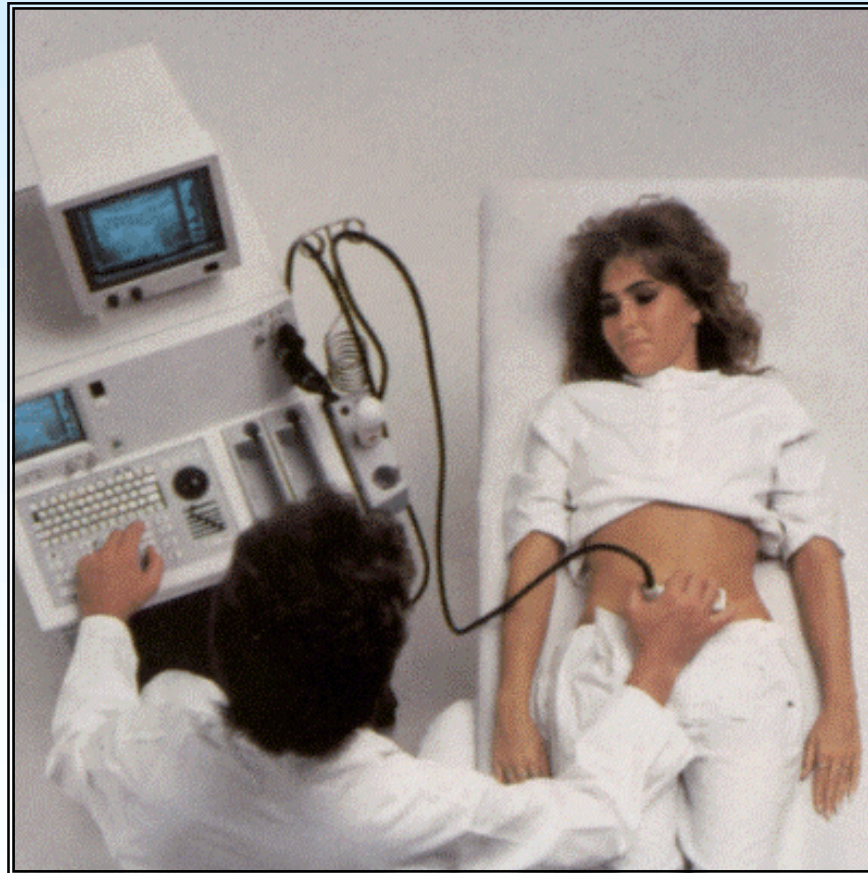
Additional equipment are necessary in order to allow for performance of specialized medical practice. For example:

- ◆ *Internal medicine-Cardiology (3-4 patients/hour): ECG, Holter, Echo-cardiography, Doppler Ultrasound, treadmill for stress-test etc.*
- ◆ *General Surgery-Orthopedics (7-8 patients/hour): Minor surgery instruments, oxygen and suction, (treatment), orthopedic devices etc.*
- ◆ *ENT (6-8 patients/hour): ENT examination unit, audiometry sound-proof room (6m² etc.).*
- ◆ *Ophthalmology (4-6 patients/hour): Slit lamps, bjerrum, perimeter, LASER (treatment) etc.*
- ◆ *Neurology: (3-5 patients/hour): EEG (+brain mapping), ENG, electro-stimulation equipment, evoked potentials etc.*
- ◆ *Dentistry: (3-5 patients/hour): Dental unit, mobile X ray (dental) system, sterilizer etc.*

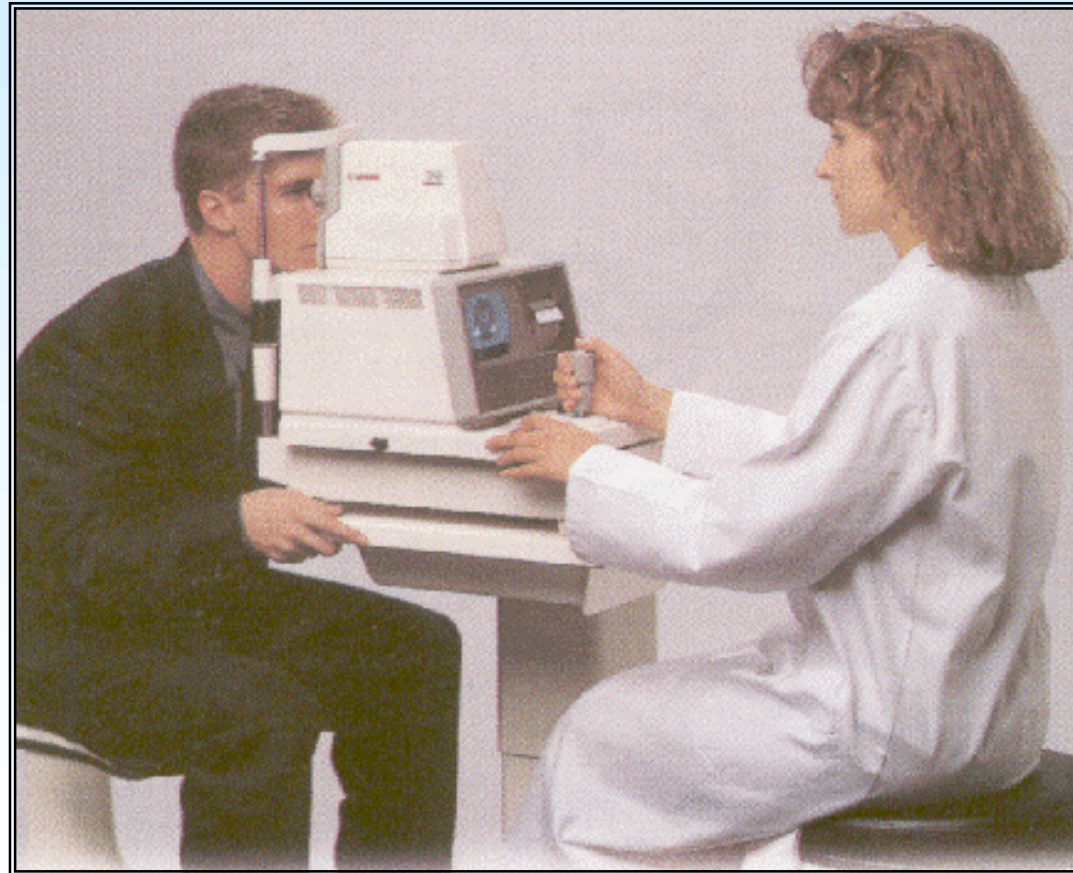
Examination/treatment room layout



Multivalent examination/treatment room



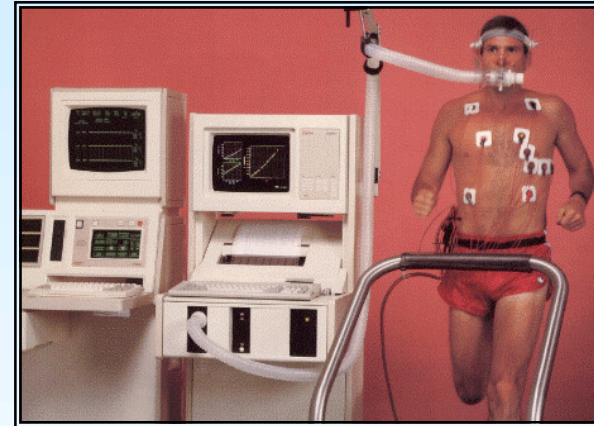
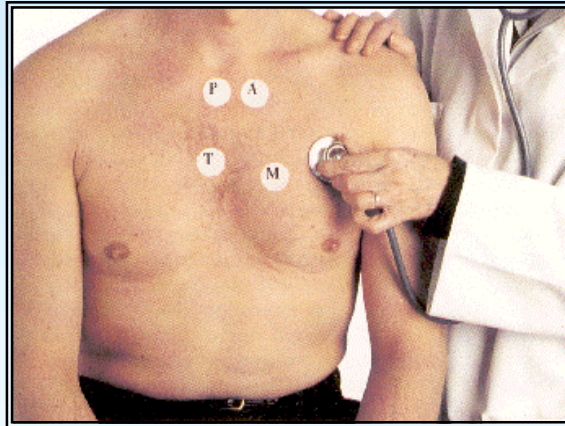
Dedicated examination/treatment room



Medical Records

- Out-patient Department Records is a part (a subset) of the general Hospital Medical Records.
- Each examination unit should have its own mini Database.
- The out-patient department data flow towards the patient record, either the outpatient becomes an inpatient or not.
- Critical points: mutual interaction of the out-patient department and the rest facilities.

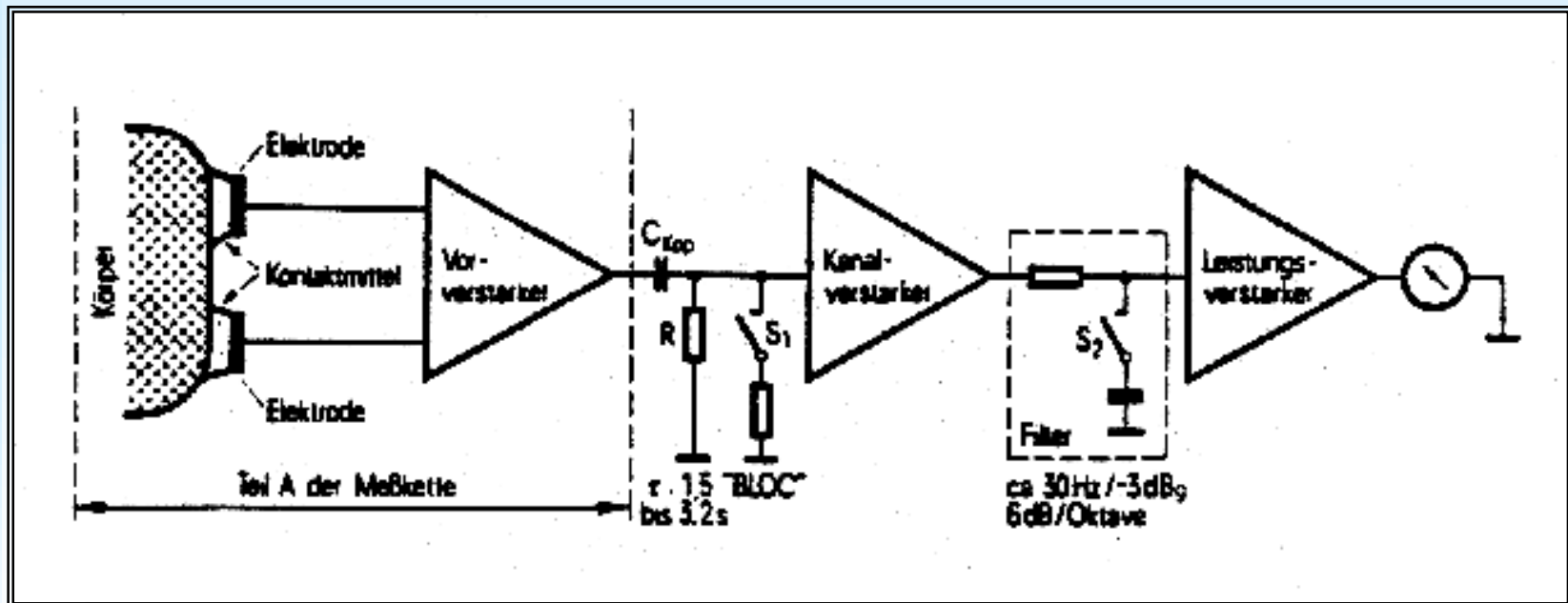
Hazards and Safety



Some of the hazards that should be taken into account in the Outpatient Department of a General Hospital are following:

- ◆ *Examination induced hazards, as fibrillation or breaking-down during stress-test (a defibrillator should be present), contrast-media allergy (emergency bag should be present) during IVP, Lymphography etc.*
- ◆ *Electrical hazards: Electrical shock through damaged electro-medical equipment or through equipment not conforming to IEC 601.1*

ECG Block Diagram



Selection criteria of electromedical equipment

- Bio-electrical signals and non electrical bio-signals are the main information sources of the in vivo Diagnostics.
- Safety and quality assurance of electromedical equipment is extremely important, in order to maintain an adequate hospital standard, as we will see in a special chapter.
- On the other hand, during purchasing, it is very important to take into account, that in vivo Diagnostic Equipment should fulfill IEC 601.1, the bio-electric amplifiers should have high input impedance and adequate constant frequency response, should have a high common mode rejection ratio and that adequate technical support will be available and on time.

ECG Decision Supporting Systems



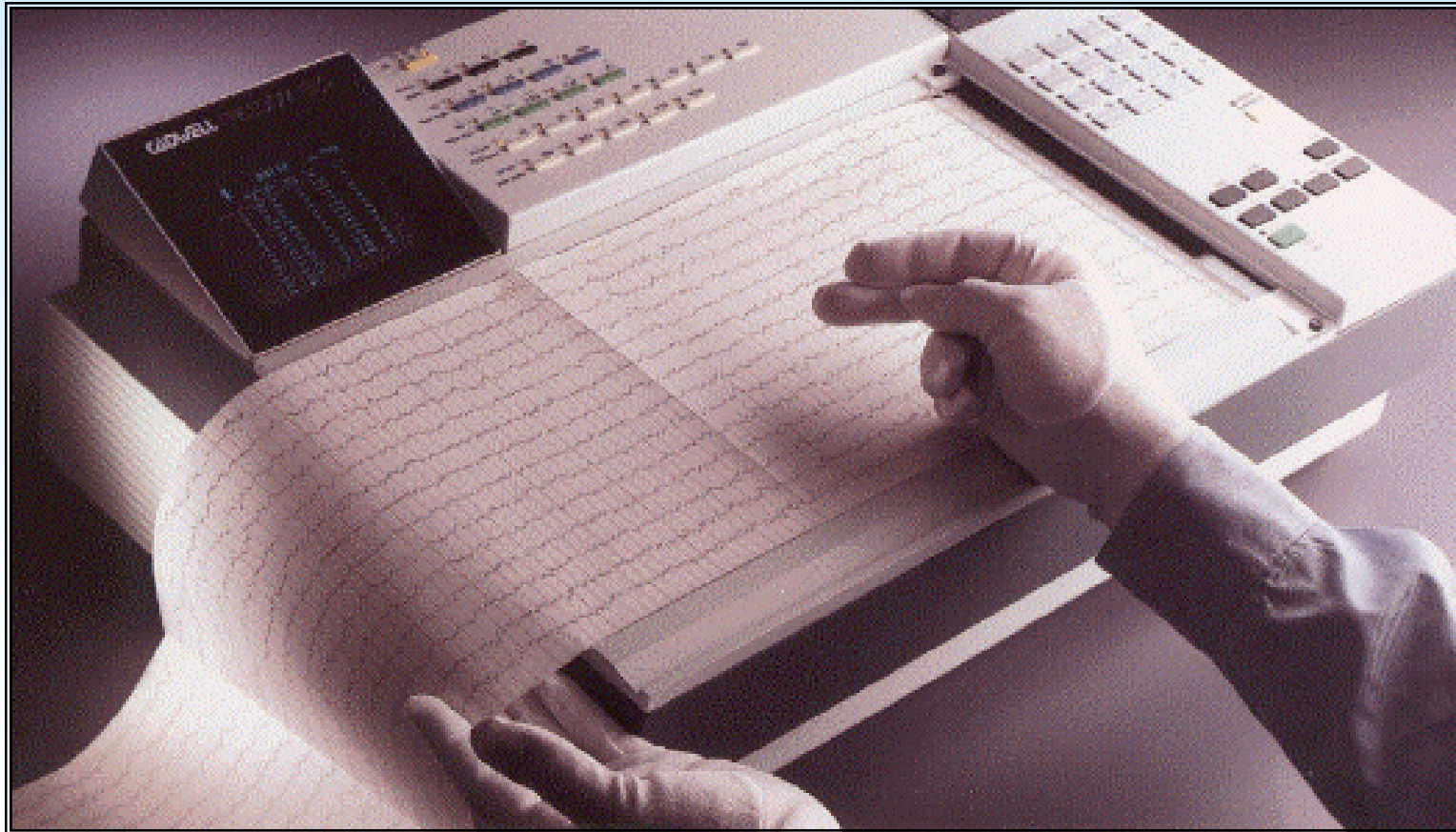
The influence of the therapeutic technology on medical practice: Ophthalmology



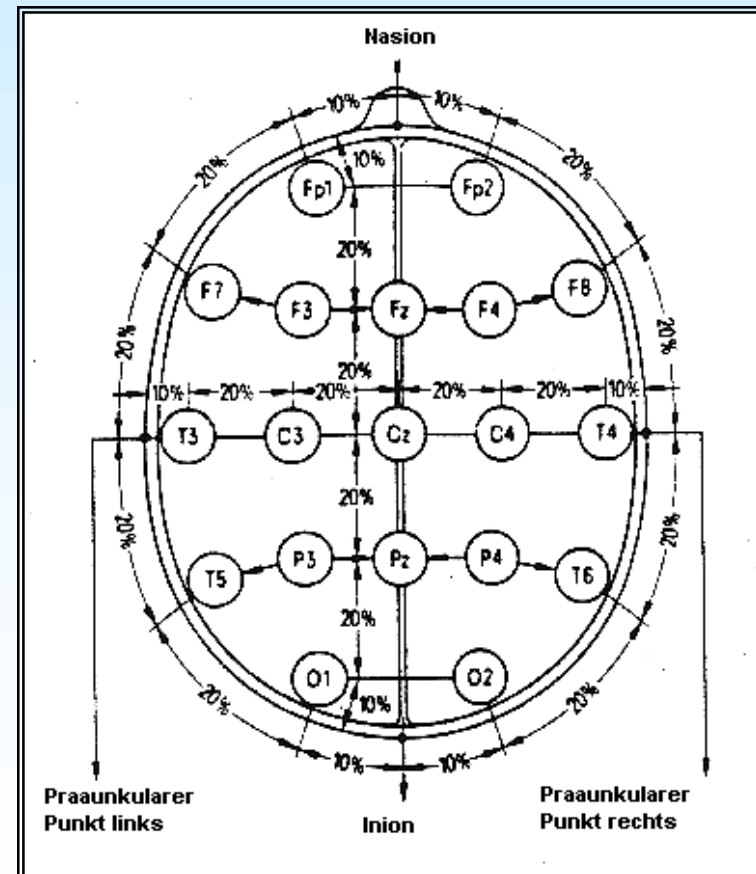
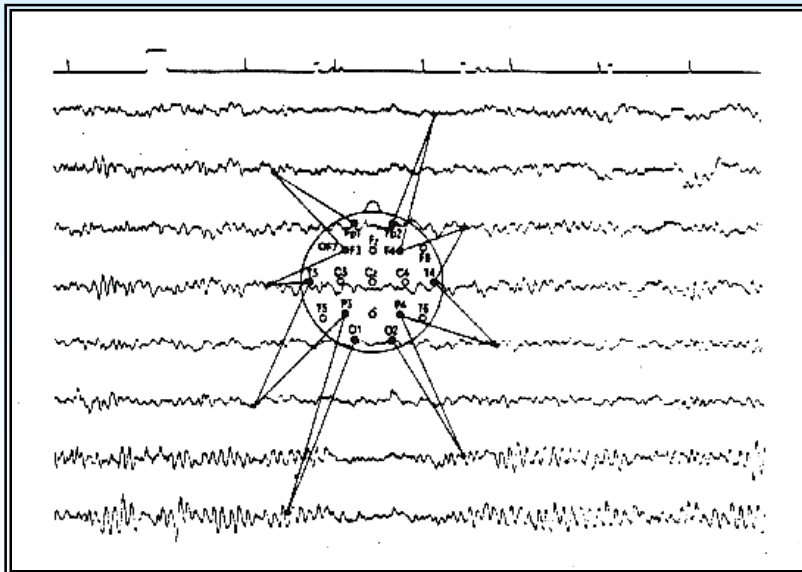
The influence of Biomedical Technology on medical practice: ENT



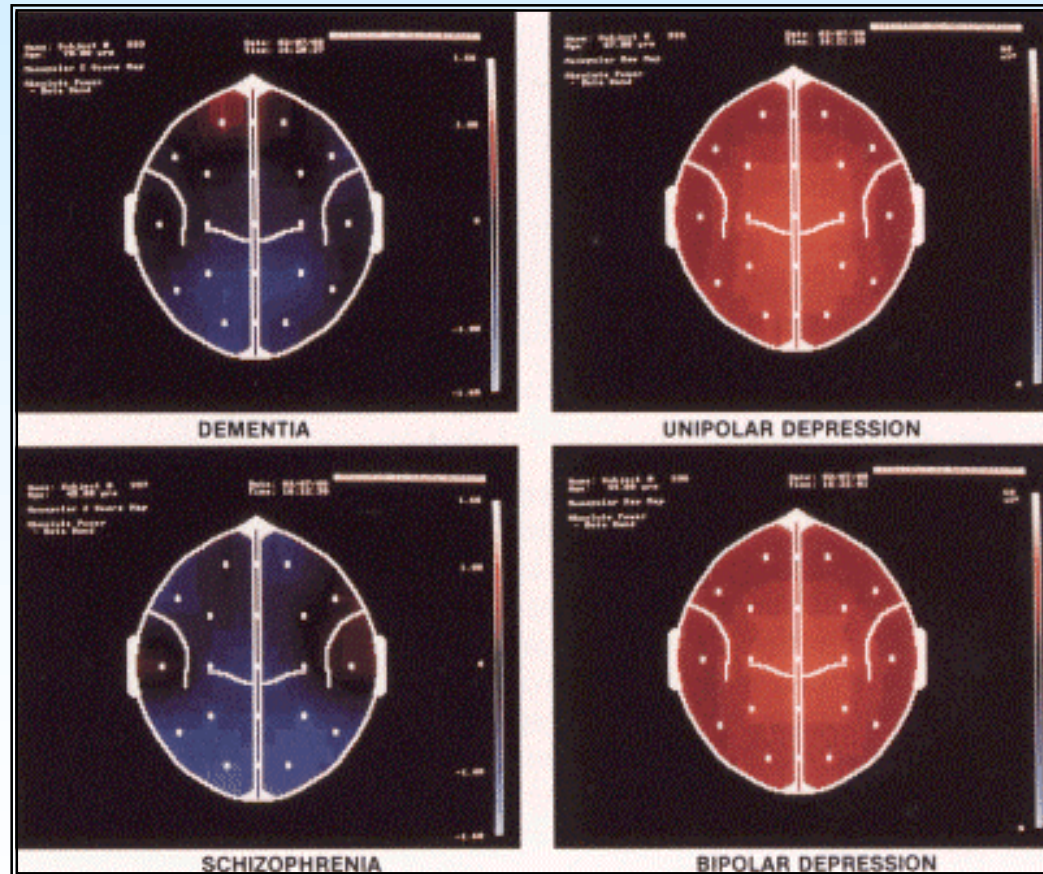
The influence of Biomedical Technology on medical practice: ENT+EEG



From classical EEG...



≠ to Brain Mapping

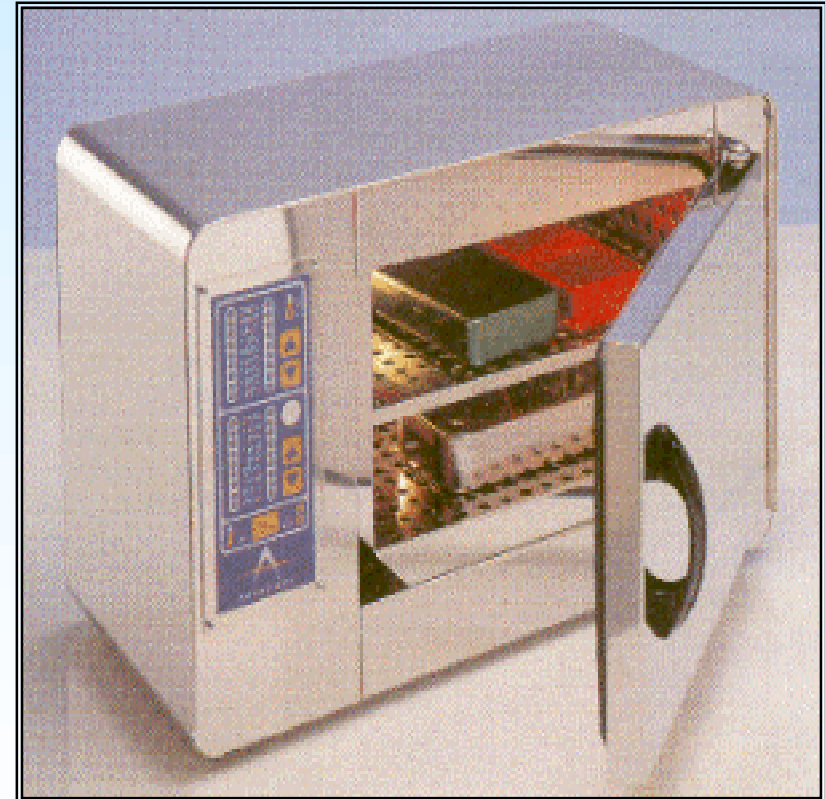


Dentistry

- Biological hazards: Hazards induced, for example, through poor sterilization of dental or other instruments.
- Radiological hazards: Unnecessary exposure because of careless behavior concerning X ray examination, as for example in dental X ray examinations.



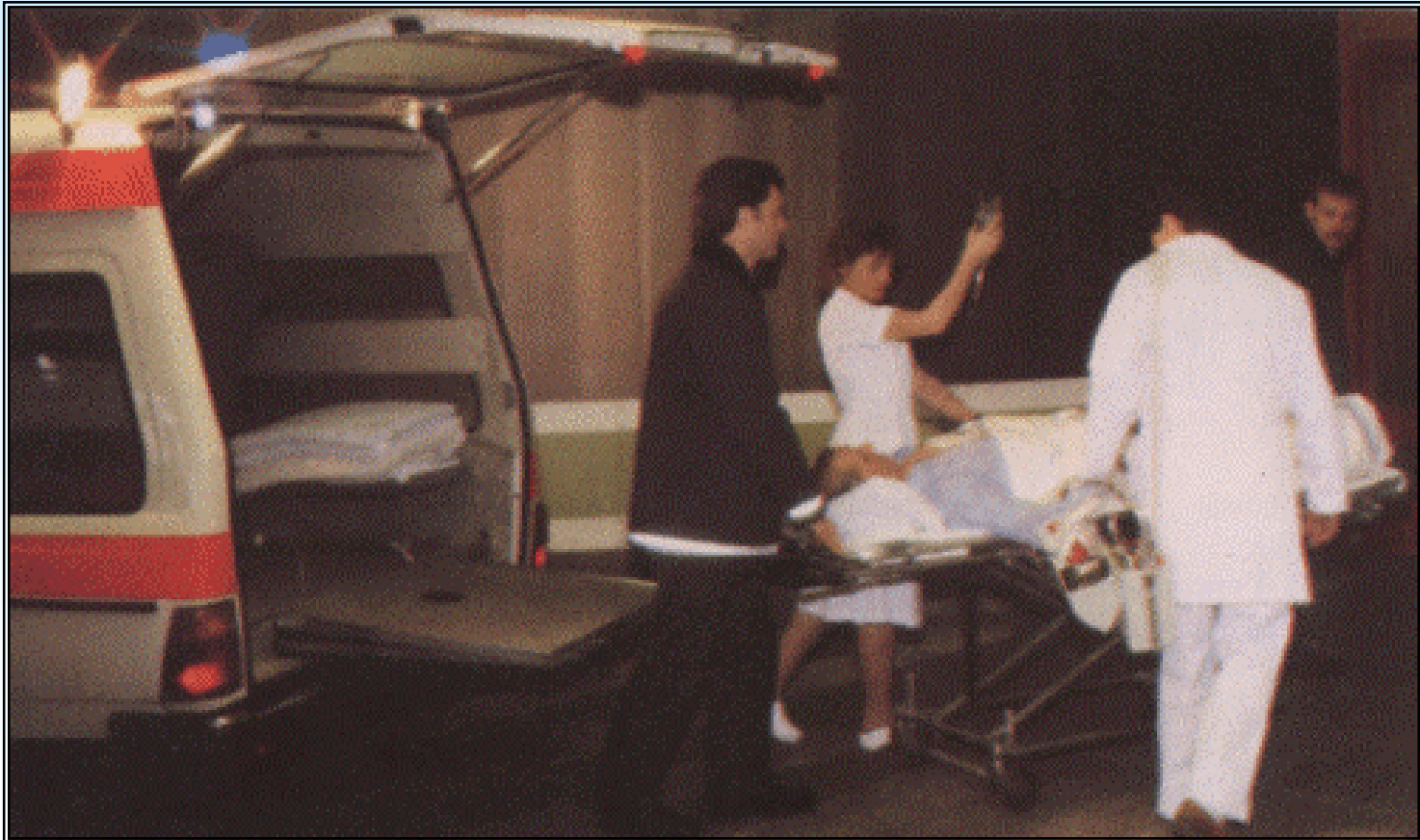
Dentistry: Hazards



Personnel room



Accident - Emergency



Emergency Department

- The emergency patient is considered or consider himself to need immediate medical, surgical or psychiatric care.
- A high percentage of the latter category may be non-emergency cases.
- To avoid an overrun of the emergency department, the regular out-patient services must be well developed.
- The emergency department must be operational 24 hours a day and is expected to deal immediately with a wide variety of complex problems.
- No "first come, first served" rule is applicable and priority is kept according to the "triage" of the patients.

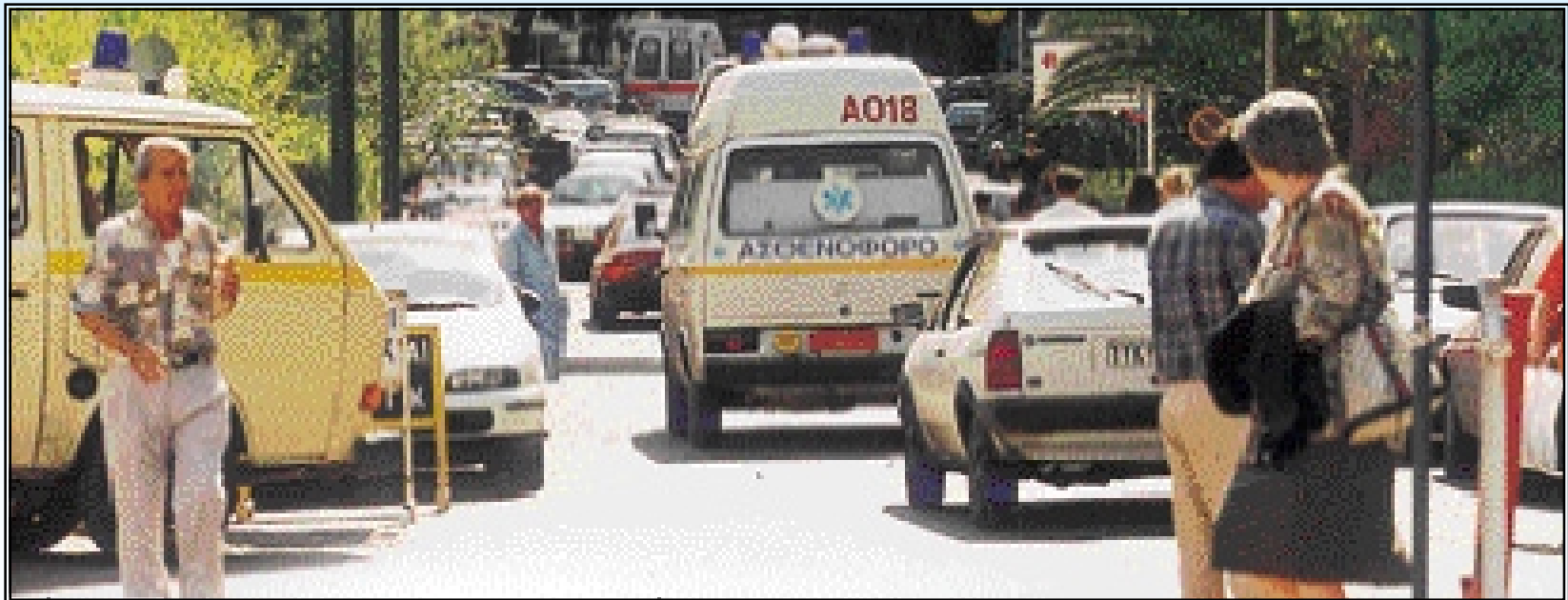
Decision making in the Accident - Emergency Department

- Decision making in the *Accident-Emergency Department* requires accelerated procedures in order to carry out the task in question, namely to prevent death or the irreparable and irreversible damage to the patient.
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Major areas

- The solution, where the emergency services are physically and administratively separated from other services in a hospital set up, has been found to be the most practical.
- Larger emergency departments can be divided according to specialties into three major areas:
 - ◆ *Surgery, including orthopedics and obstetrics.*
 - ◆ *Internal medicine, including pediatrics.*
 - ◆ *Psychiatry.*
- The emergency departments should have ready access to Operation department, X ray, blood bank, laboratories, intensive care unit, and obstetrics.

Ambulance Access



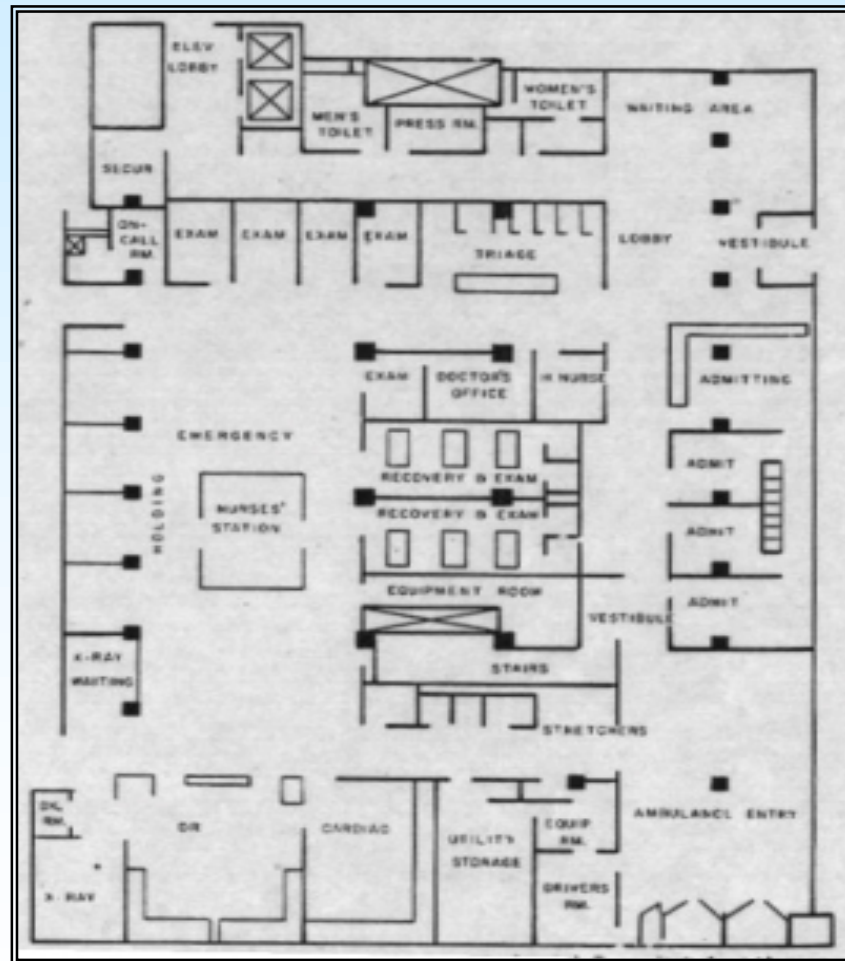
Air transportation



Emergency Department Entrance



Emergency Department layout



Area needs I

Concerning the spatial needs of the accident department, is about 10 m²/patient/day. Following areas are usually included in the department:

- ◆ *Waiting areas and administration office.*
- ◆ *Nurses' station and work room and triage.*
- ◆ *Examination and treatment area, equipped with stretchers, intubation and aspiration means etc.*
- ◆ *Resuscitation room, equipped with resuscitation and monitoring devices.*
- ◆ *Epidemiological disease and poison-control room.*

Area needs II

- Operation room, equipped to serve only emergencies as, superficial wounds, tracheotomy etc.
- Fracture & plaster rooms.
- Radiology unit or, at least, direct and easy access to the medical imaging department.
- Psychiatric examination room, that could be used also as isolation room.

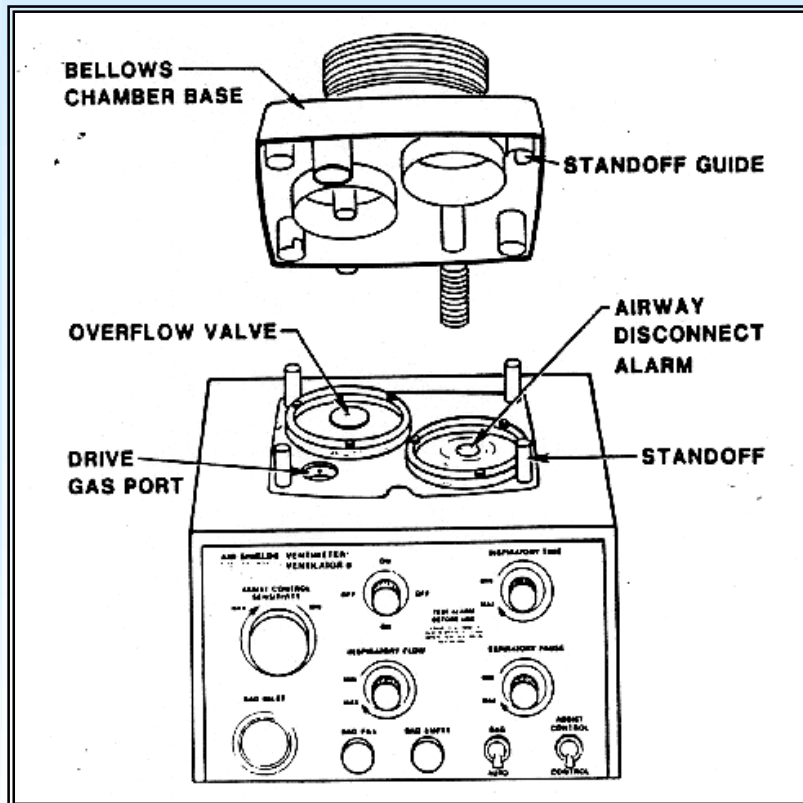
Area needs III

- Observation ward (1% of the number of the hospital beds). Patients stay less than 24 hours.
- Auxiliary rooms, as nourishment room, storage room, utility and cleaners' rooms, WCs etc.
- A disaster area (about 90 m²) should be available in each Hospital, enabling admission and triage of patient, casualties of an extraordinary event (mass accident, bomb, earthquake)

Examination Room



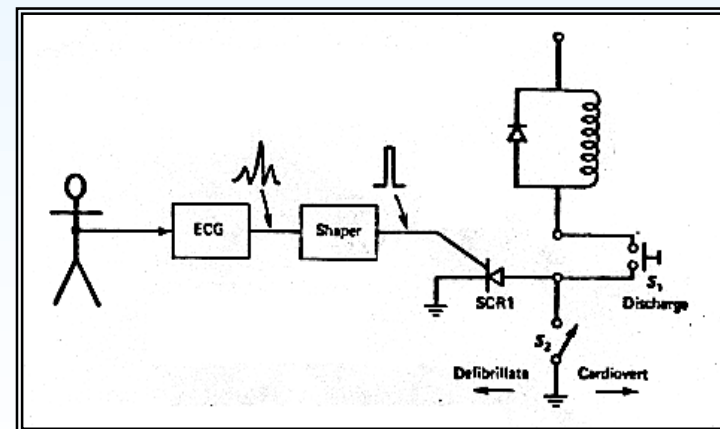
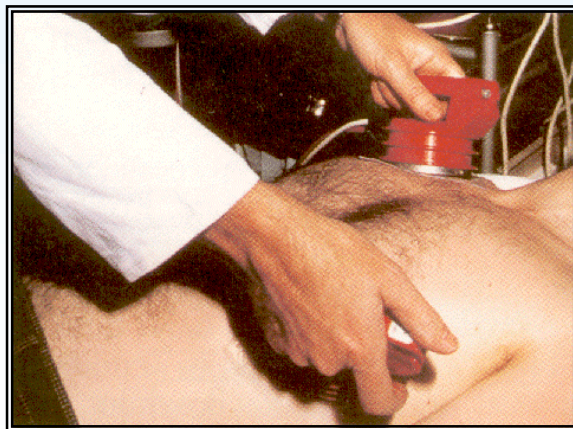
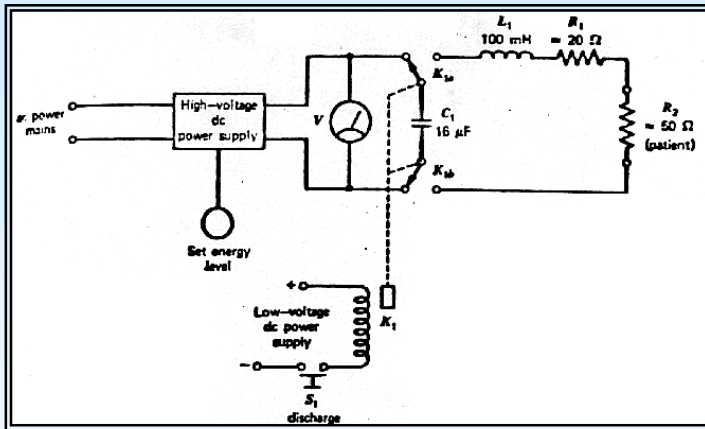
Assisted Ventilation



Resuscitation



Defibrillation - Cardioversion



Emergency Operation Room



Alternative handling: Paramedics - μ Notarzt

