TELE-SURGERY
A New Virtual Tool for Medical Education

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The Microgravity Centre
A Pioneer Space Life Sciences Research Centre in Latin America

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www.pucrs.br/feng/microg
The Microgravity Centre

Aerospace Biomedical Engineering Laboratory

Space Physiology Laboratory + Aviation Physiology & Medicine Laboratory (John Ernsting Aerospace Physiology Lab)

Aerospace Pharmacy Laboratory

Aerospace Physiotherapy Laboratory

Aerospace Biomechanics Laboratory

Aviation Research Laboratory

Telemedicine Laboratory
Telemedicine and eHealth Lab

Coordination – Thais Russomano

Technical Assistant – Ricardo Cardoso

- Research & Development
  - eHealth Assistance
  - eHealth Education

- Cooperation
- Scientific Publications
- Participation in Meetings
- Announcement of Opportunities = $$$$$
eHealth Education

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School of Medicine/PUCRS
Sao Lucas Hospital
Introduction

Scientific Knowledge

Technical Expertise in Surgery

Increasing demand of surgeons for easy and full access to high-quality information AND Growth in medical specialization

No qualified teachers or experts in certain subspecialties

Medical Centers

Lack of enough specialists to provide the required support
Introduction

DEVELOPMENT OF COMMUNICATION TECHNOLOGIES

Availability
Tools
Capability

e-Health Education Programs

Greater interaction
Virtual participation
Introduction

**Benefits of e-Health Programs**

**Surgeon**
- More control over what the students can observe;
- Minimum distraction from the procedure.

**Patient**
- Decrease in the possibility of contamination;
- Decrease in the incidence of infection in the post-operative patient.
Objectives

To allow...

undergraduate students from the school of medicine and other health related areas to virtually experience surgical procedures and lectures.

To facilitate...

the learning process by enabling undergraduate students to have better access to the operating theater and surgeon

an improved view of the patient and the surgical procedure
Objectives

To lower the risk of infection in the post-operative patient by reducing the number of people in theater during the surgical procedure;

To introduce undergraduate students to new concepts of medical care, remote second opinion and telecommunication systems;

To demonstrate new virtual education methodologies and tools to both professors and students.
Methodology

School of Medicine

eHealth Student League

Sao Lucas Hospital

Telemedicine Laboratory of the Microgravity Centre
Methodology

- Surgery Theater
- 150m coaxial cables
- Signal Concentration Point
- Lecture Hall
Methodology

- To choose from three sets of images
- To communicate with the surgeon using a wireless microphone

Sony data show projector

Total view of the procedure

Professor in the lecture hall
Methodology

Signal Concentration Point

Audio/Video Conversion
Portable Image Acquisition Device

Image & Sound
11836 Km

Students
Kaunas University of Medicine

SKYPE Video Conference Software

SKYPE Video Conference Software
From January to June of 2008

- 4 Tele-surgery lectures;
- Total of 6 hours;
- 2 lectures transmitted to Kaunas University of Medicine, Lithuania.

Accomplishments

- Anatomical structures and the surgical procedures displayed on a large screen;
- Questions answered without distracting the surgeon;
- Reduced risk of exposing the patient to additional contamination;
- Both the professor in the lecture hall and the remote surgeon were available for questions.
Results

Surgery Recordings
Conclusion

Telemedicine

• Important tool in improving medical education and health care;
• Gives the opportunity for greater interaction during surgical procedures.

Our Study Demonstrated

• The feasibility and acceptability of presenting virtual surgeries and lectures to medical students;
• The benefits of moving the students from the surgery theater to the lecture hall;
• The involvement of an international partner due to the addition of digital equipment to the system.
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INVITATION
BE PART OF THE PUCRS eHEALTH PROGRAM!!!!
Methodology

**Camera**

- Mean distance of 80cm away from the surgery field
- 520 lines of resolution
- Manual focus (adjusted by a technician via remote control)

**Signal modulation systems**

- Frequency range of 60 MHz to 66 MHz
- Point-to-point
- Coaxial Cables