

## Efficacy of Telemedicine in the Management of Orthopaedic Trauma

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### Introduction

Both telemedicine and ehealth are umbrella terms for “medical care”. Recently, however, the term “telemedicine” is contracting because it violates the direct involvement of a registered physician who accepts medical responsibility. By definition, telehealth and ehealth appear to be words that are less restrictive. It is necessary to rely on modern information and communication technologies (ICT) to get faster, better, more efficient health care delivery in some of the old hospitals that were made as separate building complexes [1].

Many of these old hospitals still do not benefit from integrated PACS/RIS/HIS systems, but well-developed mobile technologies now provide GPRS or even UMTS communication. In comparison to modern and technically advanced health care institutions, Telemedicine can actually have more impact on these pre-medicinal facilities.

### Tele-Education

Distance education and training for Orthopaedics is used worldwide. Recently, however, orthopedic webinars have been introduced [2]. With online test procedures, webinars lead today’s orthopedic surgeon in a new era of continuous education. The possibility of logging into online lectures and participating in real-time surgical procedures not only provides new obscure knowledge to widely available residents from remote hospitals, but encourages access to continuous medical education (CME).

There is also an additional benefit to doing. Interactive communication equipment allows students to direct their questions in the operating room. Webcast uses Macromedia Flash Player Programming, which supports the World Wide Web Browser. The Flash Player is set on both sides of the video conferencing system. In addition, the multiplatform availability of Flash Player operates on Windows, MacOS, Linux, PDA and Symbian operating mobile phones [3].

The collection of webinar allows users to log in offline for detailed analysis. Archived Recording, although not open for questions, online versions can be frequently asked questions. The knowledge gained during transmission can be evaluated with webinar tests. Multiple Choice Questions (MCQ) engine offers optional evaluation process [4]. This special tool was developed to prepare and complete individual tests with increasing levels of difficulty for students, residents and experts. The system is designed to modify the sequence of studies, and the engine is able to both learn and improve the exam procedures.

The topic-question-answer approach provides a limited endless supply of multiple items from limited datasets. Multiple shuffle sets of equivalent questions/answer sets can be made. The engine operates through internet browsers. Students may be given full or restricted access to academic material. The engine can generate several MCQ versions, and each student can thus receive a personalized trial version. This system includes a variety of functions including a statistical data analysis tool, a sophisticated examination composer module, output in PDF file format, and multi-lingual support.

### Image analysis enhanced tele diagnostics

This orthopedic medical support tool is the brainchild of researchers in the Orthopedics and Traumatology Department of the Loco motor System in Medical University of Warsaw, Poland. Despite the great progress made in medical imaging, classical X-ray image is still the main diagnostic medium used in orthopedics. For the first time in a series of successful “Tele Orto” projects conducted in the Orthopedics Department, there was an image evaluation module and the development of a fracture healing monitor module.

Enables former doctors to perform remote analysis of digital/digitized X-ray images to evaluate skeletal trauma and other diseases. Second tele rehabilitation module is a decision support fracture-treatment package [5,6]. The RODIA (Relative Optical Density Image Analysis) system allows users to monitor the mineralization of the fracture difference on digitized X-rays and measure the progress of treatment fairly. This system also enables physicians to monitor osteolysis, the wear-and-tear of Orthopaedic implants or other bone pathology. This seems to be a very useful tool to consider the limited availability of quantitative clinical monitoring methods. Images can be remotely uploaded for evaluation. The database is expanding, and in the near future, fracture treatment will become an excellent information source.

### Tele rehabilitation

The next step in Orthopedic Telemedicine is postoperative follow-up rehabilitation, tele instruction and supervised active practice. Most orthopedic surgeons agree that after the rehabilitation resulted in better results and improved patient satisfaction. Our tele rehabilitation application is also based on relatively inexpensive technologies. The Real Time Messaging Protocol was implemented for multimedia communication. A standard for streaming media operations with a communication server (Flash Media Server) allows multiple users to plug-in application.

Consequently, tele rehabilitation services can be provided on one-to-one basis (i.e. a physiotherapist and a patient), but the surgeon is also able to attend the session and inspect the progress of the treatment. Another approach developed is to provide multiple tele rehabilitation services from one another, where the doctor directs individual patients within the group.

### Tele diagnosis

Imaging tele diagnostics [7] is a valuable tool, for example, for hospitals located at some distance far away from each other, yet in the same clinical premises. When consulting patients, radiologists want to see wound site or clinical field (ROI). Therefore, sending digital images taken during wound dressing or adopting the patient provides an effective and time-saving solution. From a doctor's perspective, images are widely used in orthopedics and orthopedic trauma. Telemedical research branches among hospitals and universities have contributed to a rapid increase in the acceptance and use of telemedicine [8].

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