Tele-Plastic Surgery: The answer to providing underserved populations with specialist expertise for the management of acute soft tissue injuries and hand injuries, and the limitations to deployment

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The Problem

Plastic Surgeons treat hand injuries and acute traumatic wounds. There are only 6700 practicing board certified plastic surgeons. Many large areas of the US are uncovered by specialists. People in these zones are still subject to injuries which normally account for 20% or more of emergency visits..

Why is this important

Proper immediate treatment of hand and soft tissue injuries sets the course for healing and future function.

What did I do

Telemedicine involves the use of communications equipment to interact and perform a medical service through space and time. I investigated the accuracy and efficacy of telemedical principles which challenged conventional standards.

1: 100 consecutive consultations were performed and the on-site MD assessed the patient. Store and forward images were obtained and assessed independently.

2. 4 months of consecutive ED consultations were imaged and analyzed using store and forward
3. Teleconsultations were observed in an ED. An Ipad app developed for this purpose was used for telemedical consultations

Results:

Experiment 1:
OVERALL AGREEMENT = 76%
OVERALL DISAGREEMENT = 24%
ALTERED MANAGEMENT = 7%

Results:

Experiment 2:
78 consults
65 male, 13 female, 2-71 years old, mean 35
Hand injuries
- 14 bony
- 25 soft tissue
- 15 complex

Experiment 3:
42 consultations
Tele-Plastic response time 4.5 min (mean)
In house consultants response time 68.5 min (mean)
Concordance 90.5%
No inaccurate tele-Plastic responses.

Barriers to utilization:

Legal status lags behind technology
HIPPA and HITECH
- Use of internet
- Service provider ownership
- "The Cloud"

Federal v. State
- Hospital privileges
- Medical license
- Malpractice insurance

Reimbursement
- Health insurers
- Federally funded programs

CONCLUSIONS:

Image assessment **IS ACCURATE**
Image quality is **NOT IMPORTANT**
Telehealth consultations are **ACCURATE**
Telehealth consultations are **17X MORE EFICIENT**
Complex injuries require specialist care
Legal impediments must be changed

Broader implications:

Acute care telemedicine for emergency patients can be deployed in resource poor environments where immediate plastic surgical advice is not available. This can be done accurately and efficiently while avoiding long term disability and deformity. The first intervention is the most important.

Additionally, Tele-Plastic Surgery can potentially be utilized to:
Perform QA/QI analyses
Prevent medical errors in acute care settings
Prevent overtreatment in ED settings

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