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Video conferencing for Using of Telemedicine in Travel Accidents

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Abstract: Since the emergence of telegraph and telephone technologies in the nineteenth Century, doctors have been communicating and consulting with one another over long distances. Telemedicine, as distance healing was first highlighted in 1970, when Thomas Bird wrote regarding patient care in that physicians were ready to examine their patients by exploitation telecommunication technologies. In short, telemedicine can merely involve 2 health professionals discussing a case over the phone, or be as sophisticated as exploitation the satellite technology to broadcast a consultation between suppliers at facilities in 2 countries, using video conferencing equips men. Telemedicine has the potential to reduce variations within the lives of individuals, especially those living in remote areas, away from hospitals and thus empty quality and timely medical aid. The main role of telemedicine is to supply rapid access to seasoned health care professionals at a distance exploitation telecommunications and knowledge technologies, no matter where the patient is found. The spectrum of technology used in telemedicine is broad, ranging from straightforward phone, faxes and emails, to satellite-based relay transfers and state-of-the-art laptop and videoconferencing facilities. We divide video communication in telemedicine into videoconferencing and telepresence. Videoconferencing (VC) is defined as a time period, live, interactive program in which one set of participants area unit at one or additional locations and therefore the alternative set of participants area unit at another location. VC permits interaction, including audio and/or video, and possibly alternative modalities, between at least two sites. Using VC, technical requirements concerning quality area unit not sometimes terribly strict. Telepresence, on the other hand, widens the purpose of practice on the far side pure communication and has clear necessities, mainly regarding the quality and management of the image moreover as time latency. Surgery has entered the computer age with the arrival of video laparotomy. Magnified and computer-enhanced video image provided surgeons with higher exposure and image of the abdomen. However, a decade after the launch of the new technology it is still poorly accepted. Most laparoscopic procedures are tough to teach and learn, in addition, the learning curve is incredibly flat. Obvious weaknesses of new technology are: unstable camera platforms, limited motion of straight laparoscopic instruments, two-dimensional imaging and poor ergonomics for the doctor. Since the introduction of video laparoscopic cholecystectomy, surgeons have speculated that computers, 3-D imaging, and robotics might overcome these pitfalls of laparotomy.
Keywords: Video-conferencing, Telemedicine, Traffic Accident

1. Video-Conferencing

Video-conferencing (VC) is a specialized sort of telemedicine that uses technology to supply time period visual and audio patient assessment. (Kitamura et al., 2010) Originally, VC was developed to connect physicians with patients located in isolated areas at that environmental

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condition or geographical conditions render supplier or patient transportation tough and expensive (Sezeur, 1998), resulting in inequalities in patient care (Woottoon, 1999). Examples of VC practice in telemedicine are: knowledge base team conferences, teleconsultation, and tele-education.

1.1. Interdisciplinary Team Communication

Interdisciplinary groups (IDTs) area unit associate essential side of contemporary structure work and area unit a vital supporter in achieving positive, cost-effective outcomes in numerous structure settings (Procter & Currie, 2004). Nowhere is knowledge base team communication additional necessary than in health care settings, as the complex nature and demands of the health care work environments need the experience and information of differing people or specialists UN agency will work along to unravel varied and complicated patient care issues (Heinmann & Zeis, 2002). Research has incontestible that knowledge base cooperation will improve the diagnostic and prognostic talents of health professionals, more than individual health professionals operating alone, and is also essential for the interference of medical errors (Coiera & Alvarez, 2006). Over recent years, there have been significant advances within the development of technologies that support cooperation (Kuziemsky et al., 2009). VC, as a tool for improving communication between completely different levels of health care, has been described concerning a variety of surgical subspecialties (Fleissig et al., 2006). Norum and Jordhoy published a study demonstrating the practicability of VC for clinical and academic support between specialists at the University Hospital of North Norway and colleagues at the medical specialty and palliative care unit of the Nordland Hospital in Bodø, 300 miles apart. VC was a success for education and clinical case discussions with the remote oncologists in Bodø. During a 12-month amount, 32 VCs were performed and this study incontestible that telemedicine will be used for incorporating an overseas palliative care unit into a university department (Norum & Jordhoy, 2006).

Dickson-Witmer et al. recently published a study of a VC network to discuss prospective patient management problems. Information was shared on a weekly basis concerning the discussion of treatment selections and diagnostic procedures. VC led to associate increase in National Cancer Institute treatment and therefore the accruement of cancer management clinical trials (Dickson-Witmer et al., 2008). Three studies have been printed on the experiences of carcinoma surgeons collaborating in IDTs. VC was compared to previous face-to-face clinical meetings through questionnaires, attendance, number of cases mentioned, and anthropological analysis. Multidisciplinary case discussion can so be expedited by VC (Augestad & Lindsetmo, 2009). Kunkler et al. proposed a comprehensive methodology to assess the clinical and economical effectiveness of VC in IDTs (Kunkler et al., 2005). This methodology was later tested in an exceedingly randomized carcinoma trial (Kunkler et al., 2007), where 473 IDT patient discussions in 2 district general hospitals were cluster irregular to the intervention of telemedicine linkage to breast specialists in a cancer center, or to the control cluster of "in-person" conferences. VC was cost-effective, and breast cancer IDTs had clinical effectiveness almost like that of normal "in-person" meetings (Kunkler et al., 2007). There is a shortage of thoracic surgeons within the uk, and IDT meetings by VC were thus introduced. The

telemedicine meetings saved additional than 3 operating weeks of body part surgical time throughout the year (Davison et al., 2004). IDT meetings area unit used for establishing diagnoses; for growth, node, and metastasis (TNM) classification; and for treating patients with head and neck tumors. In a Swedish study, telemedicine was introduced to link a regional hospital to two of the 3 district general hospitals. The conclusion was that costs could be saved by completing IDT conferences by suggests that of telemedicine, rather than face-to-face conferences (Stalfors et al., 2005). A recent report on cancer services in Wales suggested associate degree integrated cancer service victimization VC as a clinical tool. Regular IDT conferences reduced the necessity for patients to travel. They additionally exaggerated access to knowledgeable opinion and reduced any delay in implementing treatment (Axford et al., 2002).

2. Telepresence fast the event of Telehealth Tools for medicine, travel, and Clinical analysis

Telepresence normally suggests that sticking virtual pictures of the field of view to remote sites (Satava, 1998). By employing a telerobot to telecast their hand-motions to a distant operating theater, surgeons perform operations while not really being with their patients (Ballantyne, 2002). robotics was initial developed with grants from the United States of America Department of Defense to permit surgeons at remote locations to work on wounded troopers on the piece of land (Satava, 1995). Telepresence surgery offers a technological resolution to surgical personnel shortages in remote and underserved areas. Moreover, it offers a method of rising outcomes for occasionally performed and technically-demanding operations. (Ballantyne, 2002). samples of telepresence follow in telemedicine are: surgical telementoring, teledermatology, teleophtalmology, teletrauma, and emergency telemedicine.

2.1. Surgical Telemonitoring

Telemonitoring is a lively method and includes the flexibility to guide, direct, and move with another health care skilled (in this case, a surgeon) {in a|during a|in associate degree exceedingly|in a very} completely different location throughout an operation or clinical episode. the extent of interaction from the mentor will be as easy as verbal steering whereas look a transmitted period video of the operation (Challacombe, 2010). Surgery is, most of all, a visible specialty. Live photos offer careful info regarding anatomic landmarks, giving the mentor instant info regarding the patient's traditional anatomy and pathological structures. supported this instant info, the mentor will offer recommendation to the medico and directly correct his or her surgical actions (Augestad & Lindestmo, 2009). Telementoring needs a secure highspeed reference to comfortable information measure to transmit a decent image and audio quality to the mentor's station. it's been shown that surgeons area unit typically able to atone for delays of up to 700 ms, however delays over five hundred ms area unit quite noticeable (Fabrizio et al., 2000). If victimization associate degree ISDN association, a information measure of 384 computer memory unit per second is required to relinquish comfortable image quality for correct interpretation by the mentor, though clinical work has been meted out victimization bandwidths as low as 128 computer memory unit per second (Rosser et al., 1999). there's a information gap between central and native hospitals, that is even a lot of problematic in principally rural

countries, with community surgeons spread in remote corners of an outsized country (Anvari, 2007).

The introduction of VC as an academic tool has crystal rectifier to a decrease during this information gap. till recently, the sole proved technique for teaching surgeons new skills was one-site mentoring completed with active course coaching and conferences. However, as a result of an awesome want for mentors/proctors and supporting proof within the literature, telementoring is associate degree application whose time has return (Augestad & Lindsetmo, 2009). so as let's say the potential of telementoring in remote environments, a cholecystectomy was telementored from Yale to a mobile surgery unit in South American nation (Rosser et al., 1999), and in urogenital medicine the Johns Hopkins team, unitedly with associate degree Italian cluster, with success telementored remote surgeons in laparoscopic cutting out (Micali et al., 2000). a lot of recently, a excretory organ transplant medico United Nations agency was a relative novice at laparotomy was able to initiate freelance hand-assisted laparoscopic donor cutting out by suggests that of telementoring from associate degree knowledgeable. Early results looked as if it would show that telementoring will considerably shorten the training curve (Challacombe et al., 2005). The Johns Hopkins cluster with success telementored a laparoscopic varicocelectomy and a transdermal excretory organ access for transdermal nephrolithotomy between Baltimore and city, Brazil (Rodrigues et al., 2003). The remote medico controlled the endoscope via an automatic examination System for optimum Positioning (AESOP 3000, Intuitive Surgical, Inc., Sunnyvale, CA). This cluster has currently meted out telesurgical telementoring in additional than seventeen cases victimization fabulist or the transdermal Access to the urinary organ automaton (PAKY, Johns Hopkins University, Baltimore, MD) (Bove et al., 2003). Besides the postgraduate tele-education mentioned within the Video-conferencing section, SGPGIMS additionally focuses on the coaching of medical professionals, and talent transfers by telemonitoring. the primary thriving experiment was meted out in 2004 once endocrine gland surgery was done beneath knowledgeable steering from SGPGIMS (Pradeep, 2006).

3. The Technology Aspects of Telemedicine

Using up-to-date technology is of crucial importance for telemedicine. this will be divided into 2 main parts (Austerberry, 2005): 1) Peripherals, digital video cameras, microphones, speakers, monitors or maybe special instrumentality like digital microscopes with inbuilt digital cameras, video endoscopes, ultrasound imaging devices. 2) Transmission of voice and video signals, wherever transmission is thought to be a method of causing, propagating associate degreed receiving an analogue or digital info signal over a physical point-to-point or point-to-multipoint transmission medium, either wired, glass fiber or wireless. The core technology employed in transmission systems, particularly audio and video signals, is that the digital compression of audio and video streams in period.

3.1. Peripherals

In order to transfer pictures over a distance, a digital video or still camera is required for capturing, and for visualization on a screen. There area unit many completely different industrial standards for such devices reckoning on the aim and image quality needed by such a tool. the standard of the image the camera is in a position to capture and transfer to a different device, like the monitor, depends on the parts from that it's engineered. The camera typically consists of 3 elements: lens, image device, and physical science for the image process, encoding, and transmission of the image. it's necessary that the individual parts area unit properly aligned. The business is in a position to provide high-quality cameras of very little sizes. they're used as an example, in put in endoscopic devices. Cheap or easy digicam fashions can be used in simple utility devices for teleconferencing. It is necessary that the digital camera has the alternative to center of attention on an image mechanically in the case of shifting objects or entities in space. Autofocus systems depend on one or extra sensors to determine right focus. Simple digital camera fashions have a builtin single sensor to capture images. The brightness of the photo is mechanically adjusted through the digital circuit. Such cameras are frequently used for remotely controlling a patient at some stage in surgery, for teleconsulting (as mentioned in 2.2.), and to switch pictures from the working room to the school room for students. Camera photo best depends on the size and decision of the photo sensor (a machine that converts an optical photo to an electrical signal). The picture sensor consists of hundreds of thousands of one-of-a-kind type transistors touchy into mild built-in on one chip. Today, the industry uses two sorts of image sensors for cameras: CCD (charge coupled device) or CMOS (complementary oxide semiconductor). Both technologies have benefits and disadvantages involving photo quality. Image fantastic is usually delivered through a resolution image, which is expressed in pixels. Examples of fashionable picture sizes are: 320x240, 640x480, 720x576, 720x480, 1440x720, and 1920x1080. Some high-end still-camera models can seize at a decision of 8984x6732 pixels. The satisfactory of the built-in lens is of incredible importance. They are divided into constant focal length lenses and zoom lenses, where the focal size of the lens is changeable. In general, fixed focal length lenses ordinary give higher image fantastic and they allow for taking pictures pics under critical low-light conditions. Additional lighting is supplied underneath low-light conditions. A 3-CCD digicam is used alternatively of single chip CCD for higher photo quality. 3-CCD imaging device makes use of three separate chargecoupled devices, every one taking separate captures of red, green, or light blue. Light coming into the lens is split with the aid of a prism, into the separate wavelength lights (R-red, G-green, B-blue) which are then directed in CCD sensors. The captured picture is subsequent processed in the digital digital camera module and occupies a sure reminiscence space. A video clip consists of a sequence of successive 25p (progressive) or 50i (interlaced) captured images, the portions of data being measured in Mbs. The quantity of statistics transfer (and storage space) impacts the number of pixels in the individual image frame, and the quantity of captured pics in every second. Normally, the non-compressed data amount from a CCD sensor is too high for transmission. Compression reduces the number of bits used to characterize each pixel in the image. Codec's (compression/ decompression algorithm) is used for the compression process. Some of the extra often used video codec's today are DV, MPEG1, MPEG2, MPEG4, DIVIX, and others. The goal of compression is clear: how to reduce the statistics amount as much as possible in order to keep the image/sound exceptional as high as possible. Telephone traces are one of the media thru which we can transmit video signals, however with some limitations. Data transfer is constrained by

means of the so-called bandwidth. The transfer of video by way of telephone hyperlinks in the beginning allowed a theoretical bandwidth charge of 56 kbit/s, and 128 kbit/s later for ISDN. Video transmission was limited to low-resolution image. The fashionable defines the screen sizes of the Common Intermediate Format (CIF) 352x288, and Quarter CIF (QCIF) to be of 176x144 pixels. The variety of progressively-scanned frames transmitted every second was once restrained to eight fps. After making use of state-of-the-art DSP technological know-how and by the usage of a wider bandwidth, it was once feasible to achieve transmission facts rated from 1.5 to 8 Mbit/s. Today technology approves for the transferring of awesome video and audio facts over extremely quick lengthen times (latency).

3.2 Streaming the Video over Internet

The first mission of the net used to be delivering only data. The first audio and video functions used the Internet solely as media for file transfer. A laptop needed to down load the complete file to the disk earlier than it may want to play them. As soon as the slow analog cellphone connections have been changed with xDSL, and with greater information switch speeds, the shipping of multimedia files (especially video) in real-time over IP grew to be a truth (Skalar, 2000). Streaming science now permits playing of audio and video archives immediately after being transmitted on the internet, in real-time. The User Database Protocol (UDP) alternatively of Transmission Control Protocol (TCP) is used for streaming technologies. The difference between the two protocols is how they take a look at for errors. Streaming wants a transmission protocol that can pass by facts errors. One of the first applications used the real-time was video-conferencing. Video conferencing codecs began with H.261 followed by means of H.263 codecs and the modern day advanced video codecs H.264. The time latency (propagation extend of audio and video signals) is an necessary factor in video-conferencing, mainly in telemedicine. A webcasting system makes use of the same real-time protocols, the place the latency of some seconds doesn't play a role. Another way to distribute audio and video files over IP is on-demand. The audio and video content is streamed on-demand every time a patron seeks for the content. This service is very famous in advertising, product and sales training, entertainment, Tele-education and medicine (as already noted in 2.3). The streaming method can be realized in four steps:

1) Microphone
2) Video camera: audio and video capture and encoding (compression)
3) Server: storage and streaming
4) Network: distribution

3.3 Computer on site:

Media participant performs the content Video cameras and microphones are used for shooting the audio/video. Most commercial fashions of video cameras already have built-in microphones. The microphone or surrounding noise degree is too excessive for exceptional occasions where the sound nice is of higher importance. In that case we need to set the microphones shut to the speakers as tons as possible; this eliminates the reception of disturbing surrounding noise. If there are extra audio system in a larger room, we need one microphone, a lavaliere type, for every speaker. Lavalieres are small and light-weight microphones which do no longer disturb the speaker. The microphones are connected via wire, or are wireless, where the digital audio signal

is radio transferred to the mixer station. Many cameras are typically mounted in regular surgical theatres. The outgoing signals from the digicam (video/audio) can be analog or digital. It is preferable to use robust interfaces that use coaxial cable and connectors. Analog composite uses 75 Ohms coaxial with BNC connectors, but enterprise makes use of RCA connectors for consumer cameras. Many low-cost video video display units are only geared up with composite inputs, however expert monitors furnish BNC connectors. The subsequent analog video signal is SVideo or Y/C, which uses a small 4-pin connector. The IEEE 1394 (FireWire) is a IEEE Standard, and now extensively used by way of many producers to transfer digital video/audio (and far off manage signals) records up to 800 Mbit/s. There are two variations of these connectors, a six-pin and a four-pin. HDMI (High- Definition Multimedia Interface) is a compact audio/video interface for transmitting non-compressed digital data. HDMI connects digital audio/video sources such as video cameras, digital nevertheless cameras, pc monitors, and graphic laptop interfaces. A video seize card installed in the computer converts analog or digital video and audio into the AVI format. Next, the video/audio file in AVI format is compressed with codec. Different codecs use countless techniques to compress the video. The end result of this compression is smaller quantities of video/audio data, which reduces the need for the network bandwidth. The authentic audio/video statistics charge of a DV camcorder (where video in compressed 5:1) is 25 Mbit/s, and the statistics charge for studio video cameras can attain 350 Mbit/s.

3.4 Imaging Technologies in Medicine

Three-dimensional (3D) visualisation adds a new dimension to offering video content. 3D has the capacity to visualize human internal organs in their true shape and shape (White, 2006). 3D Imaging applied sciences not solely make is possible to visualize, but additionally to analyze and manipulate 3D structures from the captured 3D image. This is sizeable for a range of diagnostic and therapeutic applications. The importance of 3D science is obvious. At the end of 2009, at the Radiological Society of North America's Scientific Assembly and Annual Meeting (NVIDIA and Siemens Healthcare) a new, 3D ultrasound viewing trip was verified that allows expectant dad and mom and their scientific caregivers to view the fetus in excellent element the use of 3D Vision-ready LCD, and NVIDIA 3D Vision glasses to display how sufferers and their medical doctors can view remarkable, high-resolution, three-d sonograms in authentic 3D. Results of latest tendencies in 3-dimensional screens supply the possibility to imparting 3D video content, the place extraordinary 3d glasses are no longer required. Efficient 3D content creation and media technology, such as VoD (Video on Demand), may want to all be in vicinity within the next few years. We want new applied sciences for taking pictures or presenting images in 3D. Although stereoscopic vision used to be first introduced in the 18th century, digital technologies have delivered new extensions. In usual stereo vision, two cameras, displaced horizontally from one every other have been used to attain differing views of a scene, in a manner similar to human binocular vision. Although most photograph shooting cameras are based totally on a twin-lens system, the cutting-edge achievements of industry exhibit a new expert digital camera which lets in the recording of 3D pictures using just a single lens. We need double reminiscence and distinctive 3D camera/3D imaginative and prescient monitors or glasses for 3D image visualisation. Glasses have continually been viewed as a predominant disadvantage to 3D on televisions. In order to visualise 3D photos on 2D monitors, there are different technologies, such

as anaglyph technology (anaglyph images are used to furnish a stereoscopic 3D effect), polarisation technology, or auto stereoscopy technology.

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