

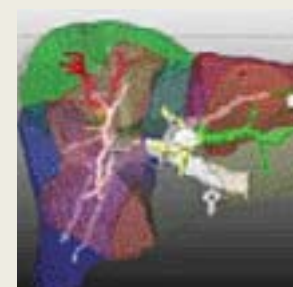



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VOL 12 ISSUE 2/03

APRIL/MAY 2003

SARS - We're just getting to know you

Report by **Brenda Marsh**

Some 4,000 people known to be infected, 204 dead, in 25 countries. Pandemic panic, faces masked, food stocked in Hong Kong (HK) homes to avoid public places. Flights, tourism and business trips cancelled. Accusations of a Chinese cover-up of the true number of cases of a new kind of disease - at first thought to be influenza or pneumonia, severely affecting older people and those with underlying illnesses. But fears mounted when health workers aged between 20-40 years fell victim to the illness - among them WHO scientist Dr Carlo Urbani, who first alerted the world to the existence of the new virus, in Hanoi, Vietnam. HK radiologists soon described severe and characteristic effects on the lungs of a pathogen that microbiologists spoke of as 'new to science'. Working at Hong Kong University, microbiologist Malik Peiris said: '... the whole genome is essentially new'.



SARS: dark areas show infected lung tissue (above). HRCT from a 70-year-old man with Sars (left/right) showing the peripheral opacification (mixture of ground-glass and consolidative) typical of Sars. The Prince of Wales Hospital's website, displaying similar Sars images, was visited by 70,000 people in just 23 days. (More images: page 6)

EXCLUSIVE IMAGES

Images courtesy of The Prince of Wales Hospital, Hong Kong and Hong Kong University ©

Lung tissue image: The Centre for Disease Control, USA

ation about Sars - and the value of the hospital's decision to share its images with radiologists worldwide - to help recognise the effects and progression of the disease - that the webpage had received 70,000 visitors by 11 April 2003.

* Radiologists are advised to visit the Prince of Wales Hospital's website for a more comprehensive viewing of cases. This feature continues, with further exclusive images from the Prince of Wales Hospital Department of Diagnostic Radiology and Organ Imaging, on page 6.

IN BRIEF

Beating Sars - herbally

CHINA - cicada tea, turnip soup, and concoctions using orange peel, ginger, leeks, and even dead silkworms and cicada skins were recommended to stave off Sars. In Beijing the wholesale price of turnips was said to have soared by more than 30% since the viral outbreak.

Did medical journals help justify war?

Ian Roberts, Professor of Epidemiology and Public Health, London School of Hygiene and Tropical Medicine, London, UK believes that most people in the USA and UK would have preferred not to go to war on Iraq. To persuade them to do so, they need to believe that they are being attacked. To this end, he said, in a letter published in the BMJ (Volume 326, p 820) that medical journals have (unwittingly) played a propaganda role. The professor compared the number of bioterrorism articles published in five major medical journals, from 1999 to 2002, with the number published on road traffic crashes (daily killing some 3,000 people and disabling about 30,000 worldwide). Articles on bioterrorism outnumbered those on traffic crashes in 2001-2002. Of 124 articles on bioterrorism, 63% originated in the USA, 37% in the UK. JAMA published the biggest number (47%), followed by the BMJ (21%), Lancet (16%), and New England Journal of Medicine (15%). Compared with daily traffic deaths, he concluded that the public health importance of bioterrorism has been over emphasised in leading medical journals.

Scientists from eight countries also confirmed that this was not consistent with any known virus.

Another virus also came under the scrutiny of researchers - the human metapneumovirus - which posed a question as to whether an 'opportunistic' combination of this and the new pathogen was causing such a knock-out infection.


The mysterious illness soon vied with the Iraq war for press headlines, and when named as Severe Acute Respiratory Syndrome (SARS), those letters suddenly became a household word.

In Hong Kong, where Sars has infected over 1,380 people, including 280 health care workers, the Prince of Wales Hospital (at the centre of the outbreak and with dozens of staff and patients struck by the virus) was soon compiling vital medical and imaging data on the new disease. On March 19th, the hospital's Department of Diagnostic

Radiology and Organ Imaging decided to establish a web-page dedicated to SARS (www.droid.cuhk.edu.hk).

In an interview with *European Hospital*, Dr Gregory Antonio, Co-ordinator of the Medical Imaging Laboratory in the hospital's Department of Diagnostic Radiology and Organ Imaging, told us: 'Radiology has a significant role to play in such a crisis situation. It can help by providing the initial imaging for diagnosis and follow patient progress with serial imaging. Those have been the traditional roles of radiology departments. Radiology departments usually have well-established telecommunications network, either for PACS or teleradiology. This allows easy establishment of a webpage for the dissemination of information and exchange of ideas, whether clinical or radiological'. Such was the need for inform-

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This information will be used only in an analysis for European Hospital, Höherweg 287, 40231 Düsseldorf, Germany, and for the mailing out of future issues of the Beta publication European Hospital. Candidates will also be automatically entered for a draw to win the prize featured on this page.

Signature Date EH 2/03

NEWS

Fears over female HIV infections

Over half of newly confirmed cases are heterosexual

UK - New research from Isis Research, the UK based, independent healthcare market research agency, indicates that 51% of newly diagnosed HIV cases in Europe are in fact heterosexual against just 36% homosexual. Thus the number of HIV females (39% of the total infected) is quickly catching up with male numbers (61% of the total).

This trend means more babies could be born to HIV-positive women, raising questions about what treatments to use or avoid during pregnancy and delivery to prevent transmission of the virus to the baby. Currently AZT is the only drug fully approved for pregnancy although small doses of nevirapine have been used to pre-

vent mother-child transmission.

Breast feeding presents a further problem: HIV can be transmitted through breast milk.

The good news: Needle-exchange initiatives across Europe appear effective with transmission via intravenous drug use (IVDU) now almost eradicated in most European countries. However, in the USA homosexual infections are still predominant.

The new Isis figures were based on 3,000 patients in France, Italy, Spain and the UK who received anti-HIV therapy between July-October 2002. 308 of these patients were newly diagnosed in 2002. Of these, over half (51%) were infected through heterosexual contact. In contrast, only 36%

were infected during homosexual contact. This is in stark contrast to the picture 10 years ago where Isis Research' figures show the split was 28% heterosexual against 38% homosexual. (In the US, infections via homosexual contact still lead, at 51%, against 31% heterosexual).

Dr Amanda Zeffman, a senior research executive in the Isis Research HIV therapy

monitor team, pointed out: 'A decade ago, most notably in the UK and Germany, the most frequent mode of HIV transmission was through homosexual contact.' The new figures suggest that the heterosexual population has become complacent about HIV, presuming wrongly that the disease still only affects homosexuals and drug addicts. 'There is a clear need for heightened awareness campaigns across Europe targeted at heterosexuals if this rise is to be curtailed.'

A&E nurse practitioners Good - but costly

In a three part study in clinical and cost effectiveness of nurse practitioners (published by the BMA in the Emergency Medicine Journal 2003; 20:158-163) a team* from Sheffield University and the Northern General Hospital have concluded that '... a nurse practitioner minor injury service can provide a safe and effective service for the treatment of minor injury. However, the costs of such a service are greater and there seems to be an increased use of out-patient services'

The three part prospective study took place in Sheffield, where an accident and emergency (A&E) department was closing and being replaced by a nurse led minor injury unit (MIU). The first part sampled patients attending the A&E department. The second part sampled patients from a nurse-led MIU that had replaced the A&E department. In each sample, clinical effectiveness was judged by comparing the gold standard of a research assessment with the clinical assessment. Primary outcome measures were the number of errors in clinical assessment, treatment, and disposal. The third part of the study used routine data whose collection had been prospectively configured to assess the costs and cost consequences of both models of care.

Results The minor injury unit produced a safe service where the total package of care was equal to or in some cases better than the A&E care. Significant process errors were made in 191 of 1447 (13.2%) patients treated by medical staff in the A&E department and 126 of 1313 (9.6%) of patients treated by nurse practitioners in the MIU. Very significant errors were rare (one). Waiting times were far better at the MIU (mean MIU 19 minutes, A&E department 56.4 minutes). The revenue costs were greater in the MIU (MIU £41.1, A&E department £40.01) and there was a big difference in follow up rates - nurses referred 47% of patients for follow up, the A&E department referred only 27%. Thus the costs and cost consequences were greater for MIU care compared with A&E care (MIU £12.7 per minor injury case, A&E department £9.66 per minor injury case).

Study by: M Sakr, R Kendall, J Angus, A Saunders and J Wardrope, at the Accident and Emergency Department, Northern General Hospital, Sheffield, UK, and J Nicholl of the Medical Care Research Unit, University of Sheffield, UK. Contact: Jim.Wardrope@sth.nhs.uk

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Selling French savoir faire



Soldasky Maternity Hospital, Russia

Entrepreneurial medical experts, architects, managers and other professionals have combined to develop hospitals and healthcare worldwide. Report by *Brenda Marsh*

Understandably, any development or re-design of a healthcare institution is multi-faceted, and, given the changes in healthcare delivery and politics, legal issues and much else, this is not a field for the inexperienced or faint-hearted. In recent years this need has resulted in a rise in consultancy, restructuring and engineering groups who, with the right expertise, can lift the burden from the shoulders of healthcare providers, whether private or public. Paris-based IRIS (www.iris-conseil.com), a relatively young but now well-established international consultancy, was founded by its present Managing Director, Gerard Adda, an energetic, entrepreneurial surgeon (Laureate of the Paris Medical Faculty, who also has a masters in marketing and

management, and is a well-known commentator on healthcare issues). In 1996, HospiConseil, which develops master plans (logistics, medical requirements, etc) for the construction of public and private hospitals, was acquired by Ideal Medical Products (IMP), a large group specialising in hospital engineering and medical equipment. This was an ideal 'marriage' to further expand their mutual activities in healthcare. As a subsidiary of IMP, HospiConseil, with its team of researchers, project planners, managers, engineers, etc. combines well with IMP's expertise - resulting in the construction of turnkey laboratories and hospitals.

Then, last year, IMP further expanded by adding IRIS Conseil Santé to its acquisitions.

The enterprise has worked on

50% of the public hospitals in France and, says Dr Adda, 'We see no reason why we can't be used in any other country.' Indeed the company is already highly active worldwide, with completed projects including Serres Hospital, Greece; Pandan Hospital, Malaysia; Soldasky Maternity Hospital, Russia, for example, and current ones, such as those in Tunisia, Turkey and Scotland (a hospital move to a green-field site), etc.

Working with the European Commission and the World Bank, the group is also reorganising primary care in two world regions. 'Our think tank is unique,' Dr Adda points out. 'I don't know of another that does what we do. We have something to sell, not only in Europe, but in eastern countries and elsewhere. We are selling our savoir faire.'



Left to right: Dr Gerard ADDA, General Manager and Senior Consultant, IRIS Conseil Santé; Dr Bruno BOUVET, Senior Consultant, IRIS; Dr Pierre VINCENT, Manager of the International Department and Consultant, IRIS; Vincent DELAUNAY, Senior Consultant, IRIS; Yohann MOURRIER, Junior Consultant, IRIS; (vi) Mélanie BIDE, Office Manager, IRIS; Jean-Louis FOULON, General Manager of HospiConseil; Philippe PIENS, Hospital Architect, HospiConseil.

International and hospital construction

In 2002, the Bahraini government opened an international competition in 2002 for the design and construction of a new 300-bed hospital in the Muharraq District of Manama in Bahrain. Among two short-listed candidates, our French team was selected over an Australian group.

During the inception meeting in Manama, the Bahrain Under Secretary for Health said we had been chosen to provide his country with the best French, state-of-the-art hospital know-how.

As the HospiConseil hospital programmer, naturally I had to wonder what was so specific about French hospitals, and that brought a surprising discovery, which I would like to share.

The Bahraini Health Ministry had a North American advisor, whom I met. With uncompromising honesty he told me that he preferred Australian hospital technology, but was out-voted in the selection. However, he hoped that we would consider the North American labour, delivery and recovery (L, D & R) concept in our design of the maternity centre for the new hospital, since that concept was increasingly accepted in Bahrain.

Indeed, the staff of the existing Muharraq maternity and of the

more recent Jidd Haffs Obstetrics hospital made use of facilities designed in a configuration akin to L, D & R: the many labour rooms were used for all the phases of birth, pre-labour monitoring, labour, delivery and recovery. However, the size of the delivery centre resulting from the many delivery rooms was perceived as a problem by midwives and doctors. A lack of labour room availability sometimes drove the staff to transfer recovering mothers to a separate area of the unit.

I remembered, from my time spent in Los Angeles, the delivery suites provided - given the right health insurance. The natural birth movement of the 80s had incited many US women to deliver at home, rejecting the cold and inhuman feel of hospital labour units. Birth was considered a normal part of life, not a disease.

That wave of home births resulted in some accidents. Hospitals then strove to offer a 'home' environment - with access to medical amenities in cases of need - within their walls. As a result, delivery suites were decorated like expensive hotel suites, with wood panelling, glass-topped credenzas, curtained windows and thick carpeting. At a pinch, the wainscot would reveal oxygen and vacuum outlets, anaesthetics paraphernalia, as well as necessary medical devices for an emergency delivery.

The challenge thus became how to reconcile the highly clinical French labour environment, entirely geared towards a potential emergency, with the woman-centred natural birth approach embodied in the L, D & R concept.

I devised a possible compromise, where women were placed, according to prognosis, either in delivery suites, according to the L, D & R concept, or in an 'intensive care' labour unit - similar to the French obstetrics block.

I put the question to our team's medical expert. After several phone calls to some of the most renowned French obstetricians, his verdict was, without question, that the L, D & R nonsense should be dismissed in the face of the priority - perinatal safety. When asked to arbitrate, our Bahraini protagonists simply repeated: 'Do your best French thing.'

I now realise now that French expertise leaves so little room for compromise due to a fundamental feature of French society - which goes back to the French revolution, and the permanency it preserved in the French way of thinking. Inspired by philosophers (les lumières), the French revolution tried to replace Catholicism, the state religion, with the culte de l'être suprême, the cult of the supreme being. Represented

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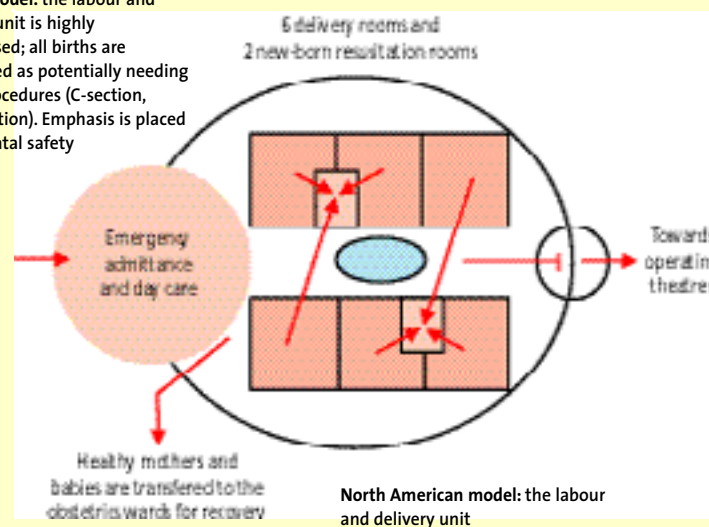
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philosophies

Philippe PIENS, Hospital Facilities Programmer at the Paris-based healthcare facility organisation and design feasibility advisory company HospiConseil, describes conflicting cross-border concepts and compromises, during the planning of a new, state-of-the-art maternity unit at the King Hamad General Hospital, Bahrain

French model: the labour and delivery unit is highly medicalised; all births are considered as potentially needing acute procedures (C-section, resuscitation). Emphasis is placed on perinatal safety



by an eye within an equilateral triangle, the supreme being was the fountainhead for *raison universelle*, universal rationality. Universal rationality should not be confused with consensus, for the latter is generated within a population. Universal rationality is above individuals. It belongs to the State, to the *valeurs républicaines* mentioned by politicians whenever they all agree to disagree with one particular individual.

One could argue that birth is, by nature, specific to women and, therefore, that women should decide how it should be done. Few French people would disagree with that, but would disregard such a notion as being non-universal, women being some humans but not all humans. There must be some universal truth about hospital labour units, just like anything else. Where do the French turn to find such universal truth? To the Faculté of course, to the learned. These wise men (few women) disagree so often with one another that, when they do agree, then it must be universally reasonable.

In spite of this norm (perhaps overly described here), the thinking of health professionals is evolving and some new features are appearing in French hospitals. In terms of birth, the new trends seem to blow in on the North wind, from our European partners. (In Germany, the labour bed tends to be replaced by a multi-position platform resembling something from a fitness centre).

Prevention of risk through training and diet are generalised. In the labour room, the baby care station is designed as a mobile unit so that ministrations to the new-born can be performed in front of the mother.

The midwife is seen less and less as a nurse and her status as a practitioner is more recognised. The time she spends with the parturient is seen as an important factor in a successful birth. The design of labour units is geared towards limiting the time away from the delivery room and the new legislation requires a full night staff, so that midwives are not - alone in the complete running of a labour unit.

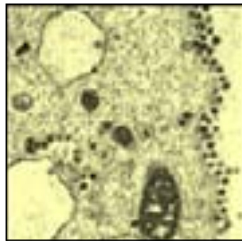
France's poor record of perinatal safety is improved through the concentration of maternity cases in fewer and better-equipped facilities. However, such a medico-technical approach does not preclude research for higher quality care, seen by some as the real source of perinatal safety.

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SARS - just getting to know you

Report by Brenda Marsh

Geneva - The first indication that a new virus had arrived came last November. As cases mounted, the World Health Organisation (WHO) worked in collaboration with 13 laboratories in 10 countries (Canada, France, Germany, Hong Kong and Mainland China, Japan, the Netherlands, Singapore, United Kingdom and USA) to find out what this deadly newcomer might be.

Canada, mid-March - Dr Donald Low, head of microbiology at Toronto's Mount Sinai Hospital, sent lung tissue from a 45-year-old Chinese-Canadian who had died of pneumonia, to the USA's Centre for Disease Control (CDC). Tests there isolated a new coronavirus.

By mid-April this had enabled scientists in British Columbia to map the virus's genetic code - a rapid time-scale.

Netherlands & Geneva mid-April - Meanwhile, the new coronavirus, which had been named by WHO and member laboratories as the Severe Acute Respiratory Syndrome (Sars) virus, was definitively shown to be the culprit by virologist Dr Albert Osterhaus and a team working at Erasmus Medical Centre, Rotterdam, the Netherlands. These scientists found that the pathogen was present in all cases of the disease: when isolated from the host, and grown in pure culture, the original disease emerged in experimentally infected primates.

The WHO issued a final confirmation that the Sars virus, never seen in humans before, is a muta-

tion from the coronaviridae family - one of the causes of the common cold.

'The pace of SARS research has been astounding,' said Dr David Heymann, Executive Director, WHO Communicable Diseases programmes. 'Because of an extraordinary collaboration among laboratories from countries around the world, we now know with certainty what causes Sars.'

Experts have now gathered at WHO to '... design the next steps, a strategy for transforming these basic research discoveries into diagnostic tools, which will help us to successfully control this disease,' said Dr Heymann.

All 13 laboratories involved were credited by the WHO for the coronavirus findings. They had, said Dr Klaus Stoehr, WHO virologist and co-ordinator of the collaborative research network, '... put aside profit and prestige to work together to find the cause of this new disease and to find way new ways of fighting it.'

The scientists collectively dedicated their detection and characterisation of the Sars virus to WHO scientist Dr Carlo Urbani, who first alerted the world to Sars - and died of the disease in Bangkok on 29 March 2003.

Test kits

The WHO collaborative network of laboratories developed several diagnostic tests for SARS, which included a test that allows detection of the distinctive genetic information of a virus.

On 4 April, primers - the key elements for a PCR test - were available on the open WHO website

IMAGING CASE HISTORY

Thousands of radiographs and hundreds of CT images were taken at a the Department of Diagnostic Radiology and Organ Imaging of the Chinese University of Hong Kong, Prince of Wales Hospital, during its huge intake of Sars victims. Full details were posted on its website. Here we show the progress of one case, with images kindly loaned for our exclusive use, by the hospital. These illustrate the progression of lung opacification typical of Sars and its resolution.

Images of a 40-year-old female with Sars, showing an opacity in the right lower zone that increased in size and then resolved. Period: 14 days, from admission on 14 March 2003



14 March



16 March



18 March



28 March

Images courtesy of The Prince of Wales Hospital, Hong Kong and Hong Kong University (c)

(<http://www.who.int/csr/sars/primers/en/>).

The Hamburg-based Bernhard-Nocht Institute for Tropical Medicine has reported that it had developed primers in kit form, with built-in quality control. This high-speed test for Sars is said to confirm the presence of the mutant strain in two hours, unlike most antibodies tests, taking over 10 days. The kits are to be distributed by a Hamburg biotechnology firm. However, the institute is offering it free of cost to the WHO collaborating laboratories, which are working to improve the reliability of PCR testing protocols and primers.

Another test, developed by the USA's Centres for Disease Control, is also ready for use.

Although existing PCR tests are very specific, they may not detect all patients who are excreting coronavirus. Thus an ability to estab-

lish, at an early stage, whether patients with clinical features such as cough, fever, chills, myalgia, shortness of breath and diarrhoea, may be infected with the Sars virus, is obviously vital in the prevention of further transmission by so-called 'super-spreaders' - by immediately isolating those patients.

Various WHO network laboratories are endeavouring to improve their PCR testing protocols and primers to increase reliability.

However, the Sars threat is by no means over. At the time of writing this report, new cases have emerged in India (Goa), Middle East (Jordan) and Italy, indicating a further international spread of the disease.

And, there are still many questions about the Sars virus profile.

The contagion time-scale for Sars is not known, nor is the 'shelf life' of the virus when outside the

human body.

Additionally, its origin is still being sought; i.e. Did this mutate from other animals to invade humans? Hong Kong University researchers reported that a new genetic sequencing of the Sars virus conclusively proved it came from animals, and research continues to ascertain whether pigs and poultry are susceptible to the virus and could be a source.

Finally, although a new study from Hong Kong University (pub: BMJ website) concluded that the agent responsible for the disease is 'highly infectious and virulent', a recent report, from the USA, showed that numbers of probable cases were less than suspected. The Centre for Disease Control and Prevention said that, although 208 people in the US were reported as having Sars, only 35 had pneumonia - considered a key symptom of the disease.

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Dan Kerpelman: Kodak's Health Imaging Group is one of Kodak's three business groups, which include photography, commercial imaging and a components business. Health Imaging's revenues in 2002 totalled \$2.3 billion. Our portfolio is divided into several areas. Film capture and output is our traditional x-ray film and processing business. Then we have digital capture, specifically in projection radiography, such as Computed Radiography and Digital Radiography. The third is healthcare information solutions: PACS, RIS etc.

We also have digital output, which comprises our laser imagers that print medical images. Finally we have a major services business, which include traditional equipment repair and maintenance as well as professional services. Those include consulting, systems integration, systems management, financing - not as a bank, but when financing is an important part of providing a solution, this is something we can offer. Those are the product areas and we operate in five world regions.

Dan Kerpelman, President of Eastman Kodak Company's Health Imaging Group, discussed film versus digital solutions, PACS and Kodak's goals in diagnostic imaging, with Daniela Zimmermann of European Hospital

Daniela Zimmermann: *We have talked about PACS, RIS and EPR for years, but all we see is small solutions in small niche areas, not a holistic approach to integrating healthcare.*

DK: I agree with your observation of the industry, which has been characterised by two extremes. The small niche players, as you call them, didn't exist 12-24 months ago and perhaps will not exist in 12-24 months time. They arrive with a very specific expertise - often with very nice features purely in terms of software comparison, but not necessarily as a holistic coverage, with the ability to understand healthcare processes sufficiently to evolve according to its needs.

At the other extreme are the big providers - the large modality companies.

DZ: *Big, yes. But they still offer the complete solution they'd like.*

DK: Well, that's my view - I'm glad you said it first. They have broader regional solutions than perhaps the small niche players, but in a somewhat rigid way. I've heard customers say that, as healthcare providers dealing with the large firms, there is a feeling that '... if this solution doesn't solve our problem, then you must have the wrong problem'. We prefer to position Kodak between those extremes, and we are big enough to provide continuity.

Indeed, Kodak has been in the x-ray-business almost since the time that Roentgen discovered the x-ray 120 years ago. And we certainly plan to be here for the next 100+ years. Over the decades, we have grown significantly from a film-oriented business to what we have today: a well-rounded portfolio that makes us a

leader in digital imaging, while maintaining our leadership in film. With this broad scope, we have the advantage of size, and can make big investments, when necessary. For example, several months back we decided to commit to healthcare information technology (IT) in a far bigger way. We're not a giant, but can be a flexible player, recognising that healthcare IT, for instance, is still a field with very specific, local requirements, such as billing and coding, public versus

private healthcare, reinvestments, insurance, large hospitals versus small imaging centres, publicly versus privately managed healthcare centres. Our size and flexibility, and commitment is recognised by our customers.

DZ: *Big film companies still thrive, and seem to waver about investing in the digital field...*

DK: That's a fair criticism of film manufacturers overall. But, speaking for Kodak, things have changed very dramatically. For example,

Kodak was very aggressive about recruiting me, because I come from the IT world, not from a media or film company. Looking at the evolution of our R&D investments as well as the alliances we are working on now, you can see that we have a long-term strategy in the digital area. We definitely will not be a company that is in and out of digital imaging and IT, and that's not just about profit. It's about the future and about leading digital transformation.

As indicated earlier, we have a broad digital portfolio that includes PACS as well as digital capture with computed and digital radiography. Our portfolio also includes digital output, such as laser imaging, which had been a neglected invention in our list, but is now one of the biggest parts of the Kodak portfolio. PACS, RIS and EPR are really at the core of our portfolio. These are critical control products that dictate how those other devices provide service and are part of the much-needed holistic solution.

To be successful in PACS is not about selling hardware or software packages. We have evolved a ser-

continued on page 8

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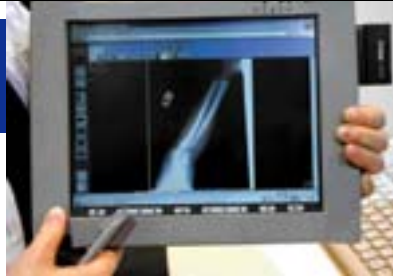
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Mobile PC

Chemnitz Hospital gGmbH, near Hanover, covers almost all medical disciplines and, with 1,855 beds and a 3,000-strong staff, this is one of the biggest in Germany. Recently the hospital, comprised of 22 clinics, eight institutes and other multidisciplinary departments, has undergone extensive renovation and construction work, with modernisation including information technology (IT) systems



Since November last year, the Pen Tablet PC 3500, with MagicWeb/Acom.web image distribution software, was field tested there by Dr Martin Herbst, who used the portable PC (weight: about 3 lbs. Thickness: under one inch. Dimension: 8 1/2 inches) during paediatric surgery ward rounds. He reported that it reduced time spent

by up to 30 minutes, and eliminated some later work because he did not have to examine X-ray and report images on the PC after each round. Input of new data into the RIS/PACS system takes place at the bedside.

Made by Fujitsu Siemens Computers (FSC), the mobile electronic patient folder is part of the Sienet Version 40 integrated radiology suite. The PC's wireless LAN infrastructure allows mobile access across a ward to the server containing patients' folders plus corresponding data and X-ray images.

Instead of using a keyboard and mouse, a special pen is used on the mobile PC's screen. Much like a notebook, the PC uses an infrared keyboard. Also, when connected to a docking station, it provides full desktop functions.

During the field test, roaming, i.e. changing from the signal range of one access point to the range of another, functioned perfectly. Patient data security is guaranteed by the Sienet mobility concept, says the manufacturer.

Following the successful field test of the Tablet PC, they now will be used in all the hospital's wards, said Dr Olaf Schlimpert, Head of Medical Information Technology at the hospital, who added: 'My goal is to install a wireless LAN infrastructure throughout the Chemnitz Hospital.'

Voice recognition Kaiser Franz Josef Hospital, Vienna, is using Siemens' Sienet 40, an integrated voice recognition radiology system. The hospital's personnel say reporting time has thus been reduced from 10.5

to 6.5 hours, a 38% drop.

The hospital's objective was to integrate RIS and PACS into a single database, and a voice recognition system was to be implemented to allow for rapid changes in users and individual identification.

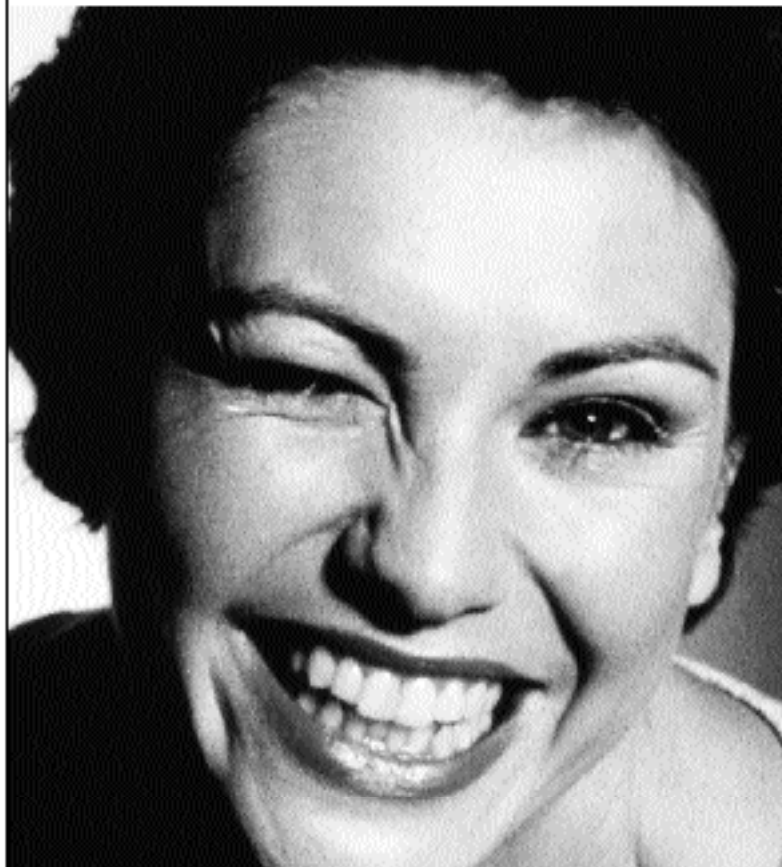
Following the upgrade, each workstation at the Kaiser Franz Josef Hospital can access information on parallel patient examinations as well as create integrated reports, for same day relay. An additional advantage is that urgent reports can be created when administration teams are not available, e.g. during night shifts.

Capri PET Conference

The European Association of Nuclear Medicine (EANM) will cover oncology; cardiovascular and neurosciences, and demonstrate new equipment, from 7-9 May. Venue: Grand Hotel Quisisana, Capri, Italy. Details: www.capripet2003.it

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Precision radio therapy

Professor Wolfgang Schlegel, Head of the Department of Medical Physics at the German Cancer Research Centre, has been awarded the 2003 clinical section of the German Cancer Award, for significantly improving the precision with which radiation beams can be directed at a tumour. Computer-based multileaf collimators and programmes for 3D-therapy planning developed in his department ensure healthy surrounding tissue is not affected by radiation.

Malignant tumours 'horse-shoe' around highly radiation-sensitive organs (e.g. optic nerve, bone marrow). Prof. Schlegel recently developed intensity modulated radiotherapy (IMRT) in which the radiation beam intensity can be modulated within the target area. Consequently, the



radiation dose to the tumour can be increased without affecting surrounding tissue.

A first comprehensive study (USA), involving some 700 prostate cancer patients, indicated that IMRT reduced serious side effects and increased disease-free survival rates. The German Cancer Research Centre has been conducting a study since 1998 to clarify which tumours are best treated with IMRT. To date, about 400 patients with head tumours, tumours close to bone marrow, plus prostate and breast cancers have been treated, with very promising results.

ECR medalists

Vienna - Dr Erik Boijesen of Lund, Sweden, and Dr. Rafaella De Dominicis of Florence, Italy, were awarded The European Association of Radiology's Boris Rajewsky medals.

Toshiba panel of experts

VIENNA - Toshiba Medical Systems Austria presented a top panel of experts at the ECR to introduce the latest developments in cardiac CT-scanning and dynamic flat-panel technology - the new benchmarks in digital angiography. A further session covered the scientific platform for new uses in ultrasound scanning.

A combination of image amplifier and high resolution CCD camera technology, dynamic flat-panel technology (4.3 lp/mm) is considered top standard for digital and interventional imaging. Special features of the flat panel detector, such as signal interpretation in a single step and minimum pixel size of 150µ x 150µ - suitable for clinical use - deliver more scope for exposure time and they improve image resolution, cut out distortion and reduce the X-ray dose.

P. Peloschek, head of radiology at the Thermenklinikum Baden, expects more detailed imaging and higher resolution from new generation flat panel technology - particularly important, for example, in recognising increasingly smaller details, such as orientation markings on stents. The new technology is expected to offer significant improvements in the diagnosis of abdominal aortic aneurysms, as well as in the examination of peripheral vessel structure in the lower thigh, ankle and neuro-vascular areas.

The new Toshiba CT Aquilion 16/cfx, showing 16 slices with 0.5mm per rotation simultaneously, achieves far more detailed coronary images whilst optimising workflow. Combined with spe-

cialised, cardiac segmentation software, this achieves a time resolution of up to 50 milliseconds per slice with a rotation time of 0.4 seconds, which means the entire heart can be tomographed with a 16 x 0.5mm selection in 25 seconds. This makes analysis of cardiac anatomy and function possible with only one data set. A special software tool facilitates the automatic reconstruction of axial, sagittal and coronary slices, even with variable parameters, without any extra work. The spiral scan area measures 175cm, so there is no need to move a patient in several examinations.

'Whether additional features such as panoramic images will become popular depends on the users,' P. Peloschek pointed out. 'For progress monitoring of tumour treatment a panoramic view would definitely be a helpful tool.'

He presented a more pragmatic view of contrast medium examinations with ultrasound - currently promoted by ultrasound contrast medium manufacturers to examine inflamed joints, for example. 'This method is very personnel and cost intensive, like MRI scanning, but documentation is more difficult. The procedure would certainly benefit smaller hospitals, without a MRI scanner, and it may also be of interest for patient examinations in surgeries, but many doctors will probably await further technological developments in this field.'

Report: Christian Pruszinsky



P. Peloschek

continued from page 7

vice model. We have a technology and innovation centre, in Genova, Italy, with a very intelligent team who understands healthcare, clinical issues, workflow, image, therapy etc, and they have a very deep knowledge of the technology for PACS and other systems. Typically, they start with a consultation with a customer - there are no invoices or costs - they just work side by side to developed plans to suite customers' needs.

At the technology centre, we can simulate how products like PACS and RIS will integrate with an existing hospital infrastructure, that is, if a hospital has already decided about RIS or archiving technologies, our experts will solve interoperability challenges (I believe that any individual component of healthcare IT, or imaging, will become very compatible one day). Then, before installation, users come for training and test-driving - like when buying a car. Customers can also visit actual sites where our equipment has been installed to see how it performs in 'real-life' situations. These sites include Stavanger, Norway, Hammersmith, London, or Delft, Holland - one of the biggest PACS installations worldwide.

Some people think of Kodak only as an American company - but we are very European. We engineer and manufacture in Europe. In Chalon-sur-Saône, France, we manufacture 40 million square metres of X-ray film annually. That's one of our biggest manufacturing facilities, and the biggest employer in Burgundy. We also engineer and manufacture our RIS system in Reykjavik. Our film-finishing factory is in Berlin, and we have a dental enterprise in Stuttgart.

More than 1,600 hundred of our employees, about a third of the total workforce, are in Europe, and about a third of our business is generated here. So while our roots are in America, we also consider ourselves to be a European company.

Christopher Pryce, PhD, describes a promising test that can predict the onset of Alzheimer's disease some two



years earlier than currently available tests can determine. Furthermore, the test can be used in non-human primates in order to research the neurobiology and pharmacology of such neurodegenerative illnesses. Dr. Pryce is conducting preclinical research with this test together with Professor Joram Feldon and Ms. Simona Spinelli, at the Behavioural Neurobiology Laboratory of the Swiss Federal Institute of Technology, Zurich. EUROPEAN HOSPITAL interview: Denise Hennig

Earlier diagnosis for Alzheimer's

90% reliability that someone who scores badly on this test will be diagnosed with Alzheimer's, within one or two years. The damage that causes this disease has already occurred, but current behavioural tests to definitely diagnose Alzheimer's are not sensitive enough.

For patients, diagnosis is a dilemma, but I think there is also some good news because the doctor can prescribe the person medication to slow the progress of Alzheimer's. Such medication is referred to as a cognitive enhancer, and our own research is aimed at

contributing to the development of improved cognitive enhancers.

EH: How long has the test been on the market?

CP: We are using an existing test (Cambridge Neuropsychological Automated Test Battery (CANTAB), Cambridge Cognition Limited, Cambridge, UK). In about 1990, psychologists at the University of Cambridge, England, began to develop this set of computer touch screen tests. The same tests can be used in humans and monkeys because they don't require verbal responses - and these tests include the paired-

associates learning test, which is sensitive to an early Alzheimer's condition. It is used by doctors to screen patients who show psychiatric symptoms. For example, people suffering depression have memory problems, yet they score well on this test. People with Alzheimer's score poorly on the test, so it allows us to make a specific statement about Alzheimer's.

EH: What are your plans for the future?

CP: We're working closely with the pharmaceutical industry on the development of new cognitive enhancers, which improve memory

and attention, particularly for those people who have trouble with these, which of course includes those in the early stage of Alzheimer's. In the development of any new drugs there's a pre-clinical stage, in which potential new compounds are used in specific behavioural tests to see if they affect the performance of animals. We use primates because, in evolutionary terms, they are a step closer to humans. The pharmaceutical industry recognises the importance of primate work in this area; in fact, Simona Spinelli who is conducting some of this research for her PhD degree, is funded by a studentship from Hoffmann-La Roche.

Christopher Pryce: We use paired-associates learning tests on primates. A task is presented on a touch-screen computer and the subject has to respond to stimuli - these are symbols that appear on the screen in certain positions. When a symbol appears the monkey touches it to show that it has seen it, and as it touches it, the symbol disappears. Then a second symbol appears which it must touch, and so on. Each of these has been presented in a specific position on the computer screen.

Then comes a memory problem: The same symbols that were presented once in a specific location are presented again on the screen - but each is now placed in different



Primate and touch screen

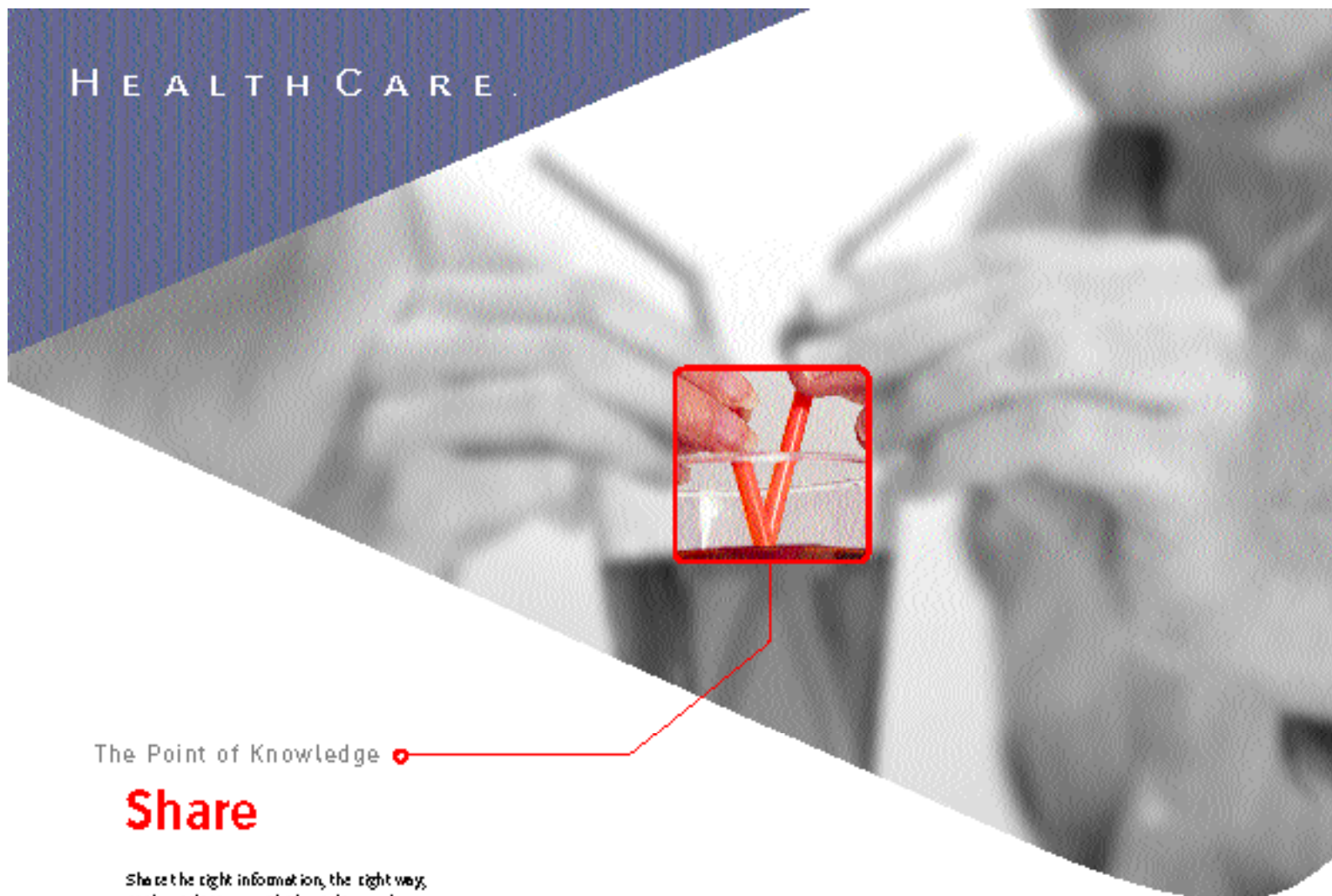
positions. By its behaviour, we can see how the monkey tackles the question: 'Which position did I see that symbol in before?' Touching the symbol at the location it was originally presented leads to the monkey receiving a reward (i.e. banana milkshake).

EH: Has this system been tested on humans?

CP: The test is developed deliberately for use on both humans and monkeys. The symbols are made up of abstract shapes and lines and of different colours. Because the test is non-verbal, it can be used in monkeys as well as humans. For humans, the idea is to make it as difficult as possible for the subject to think 'That's a square', or 'That's a circle'. What they have to remember is the location, or relationship between a symbol and its position. And because he has to simultaneously remember several such relationships, then his working memory is challenged. This appears to be extremely difficult for patients of Alzheimer's including those in the very early stages - which standard methods for diagnosing this problem cannot recognise. The aim of our laboratory is to understand, in animals, how the brain controls normal behaviour and when it stops functioning correctly.

EH: How reliable is the test, and what effects does a diagnosis of the disease have on patients?

CP: It has been demonstrated with



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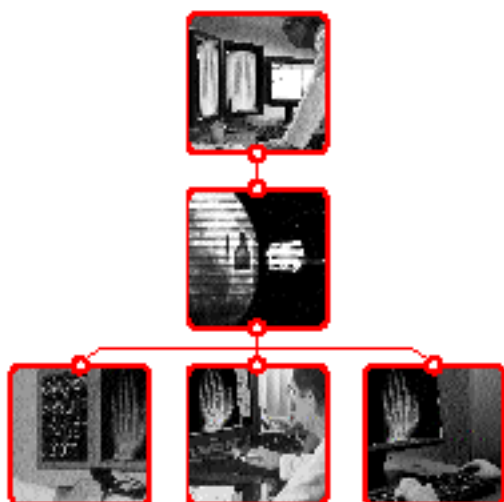
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Stick to conventional tests!

New cervical smear tests are not better

FRANCE - Researchers have found new cervical smear tests to be unreliable and conclude that these should not replace conventional tests (PAP smears). Their study also emphasises the need to improve the 'hard evidence' in studies of new technologies. It also has implications for the regulation of medical devices and clinical practice, as well as hospital laboratory economics.

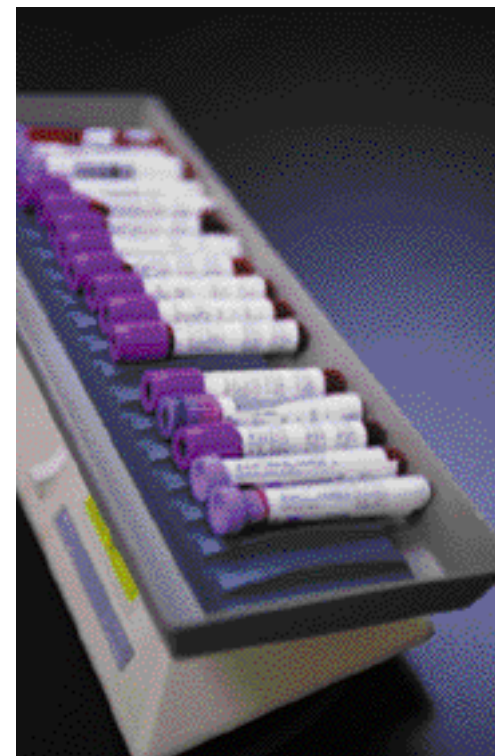


The French study involved 828 women, referred to hospital due to abnormalities detected in previous smears, and 1,757 women attending for routine smears. Each had a conventional cervical smear test, then the remaining sample was tested by two new methods - monolayer cytology and human papillomavirus DNA testing - tests which are replacing conventional smear tests in several countries.

PAP smear tests consistently showed better sensitivity and specificity than monolayer cytology - which is also more expensive. The researchers also pointed out that human papillomavirus testing performed no better than conventional smear tests, and they conclude that this test should be further evaluated.

* Pub: *British Medical Journal*. Volume 326, pp 733-6. 'Cross sectional study of conventional cervical smear', by Philippe Vielh, pathologist and President of the French Society of Clinical Cytology, Curie Institute, Paris, and Professor of Medical Statistics, Joel Coste, of the Public Hospital, and Cochin-Port Royal Medical Faculty, Paris V University.

Advances in



Today's test formats (gel technology, micro test plates), plus laboratory electronic data processing and automation, have changed the classic format of blood group serological examinations significantly - and reduced the danger of life-threatening errors.

However, the degree of automation for blood group serological patient diagnoses, in hospitals or in prenatal diagnostics, has not kept pace. In the recently published annual 'Serious Hazards of Transfusion' (SHOT) report covering 2000-2001, 92% of English hospitals reported incidents or near-incidents during transfusions. 315 incidents were registered as occurring during transfusions. In 213 of these, the wrong blood type had been transfused. In 14% of these cases this related to incompatibility of blood group AB0. In 10% it was intolerance of the Rhesus factor Rh(D). The transfusion of incompatible blood in the AB0 group led to one death and severe follow-on illness in three cases due to intravascular haemolysis.

Over five years, the SHOT analysis found that during 699 transfusion incidents, 11 patients died and another 60 became so ill that they were admitted to intensive care units (ICUs).

The SHOT report reveals that about 30% of mistakes and reasons for transfusion incidents emanated from hospital laboratories. Interestingly, over a third of mistakes occurred outside the labs' routine hours, an observation that questions the experience of night and weekend staff to ensure techni-

cally faultless implementation of testing and interpretation of results.

Analysis of mistakes shows that, within blood group serology (typing, antibody diagnosis, compatibility examinations), the reasons for the errors were very different.

In blood typing (AB0, Rh(D)) in most cases it was not the choice of reagents or technical procedures that led to the wrong results; it was unsuitable laboratory organisation (necessary controls not being performed, no cross-checks with previous results). The reasons for mistakes in antibody diagnoses (antibody search and identification) are more varied. This involved both unsuitable laboratory organisation, the fact that methods that were not sufficiently sensitive - such as those used to diagnose clinically relevant Kidd antibodies - and the technical failure of reagents, which led to



High-res colour photos of micro-specimens

Demand for fast, low-cost production of true-colour, high-resolution micrographs of light microscope specimens or colour contrasting techniques, is met by the AxioCam MRC5, a colour camera with a high-resolution, 5-megapixel CCD sensor, according to the manufacturer Carl Zeiss. The camera and a fast FireWire data interface also enable connection to a PC or laptop.

'A fast, live image of the microscope specimen is available and permits smooth handling and setting of the specimen on the microscope. Thanks to the AxioVision recording software, control of the camera is the ultimate in convenience,' the firm adds. Also, '... the camera, software and microscope can be upgraded with many software modules. With coloured images and colour contrasting techniques (e.g. polarisation microscopy of metal or rock sections) in materials research, industrial inspection and the life sciences, this offers a new dimension in quality to documentation, evaluation and analysis.'

\$430.3 billion global spend on drugs

Global sales of prescription and over-the-counter drugs grew 8% to \$430.3 billion last year, according to the annual IMS World Review report, which tracks about 90% of all prescription drugs and certain over-the-counter products in over 80 countries.

North America, Europe (EU) and Japan accounted for 85% of audited worldwide pharmaceutical consumption in 2002. North American sales grew 12% to \$203.6 billion - over half of all global sales.

European (EU) sales grew 8%, to \$90.6 billion, whilst the rest of Europe saw a sales growth of 9%, to \$11.3 billion. Japan had a 1% growth, to \$46.9 billion. In Latin American sales declined 10%, to \$16.5 billion, blamed on economic conditions, while pharmaceutical sales growth in Asia (excluding Japan), Africa and Australia was \$31.6 billion, up 11%.

The top-ten drug therapy classes accounted for 31% of the total audited world mar-

ket. Three of these - cholesterol & triglyceride reducers, anti-psychotics and erythropoietin products - each grew more than 10% each, with anti-ulcerants up 9%.

The anti-ulcerant class, covering stomach ulcer treatments, saw \$21.9 billion sales last year, keeping it in the lead worldwide, as in the last 13 years. Last year anti-ulcerants represented 6% of all audited global pharmaceutical sales. Losec/Prilosec (omeprazole), the world's leading anti-ulcerant and number 3 in overall drugs sold, accounted for \$5.2 billion of all sales in this class.

The second-ranked therapy class, cholesterol & triglyceride reducers, grew 12%, to \$21.7 billion sales. Contributing to that growth was strong demand for Lipitor, a cholesterol treatment - and the top-selling drug worldwide. Lipitor sales were up 20%, to \$8.6 billion. Antidepressants,

Leading Therapy Classes in 2002 Global Pharmaceutical Sales*

Audited World Therapy Class	Sales (US\$B)	Percentage global Sales (US\$)	Percentage growth Year-on-year (Constant dollar)
1 Anti-ulcerants	21.9	6%	+9%
2 Cholesterol & Triglyceride Reducers	21.7	5%	+12%
3 Antidepressants	17.1	4%	+5%
4 Anti-rheumatic Non-Steroidals	11.3	3%	+1%
5 Calcium Antagonists Plain	9.9	3%	-1%
6 Anti-psychotics	9.5	2%	+19%
7 Erythropoietin Products	8.1	2%	+18%
8 Oral Anti-diabetics	8.0	2%	+2%
9 ACE Inhibitors Plain	7.8	2%	0%
10 Cephalosporins & Combinations	7.6	2%	-3%
Total Leading 10 ATCs at Level 3	\$122.8	31%	+6%

Source: IMS World Review 2003

the third-ranked therapy class, experienced 5% sales growth, to \$17.1 billion.

The top-ten best-selling drugs worldwide accounted for \$44.7 billion in sales last year, an 11% percent increase over 2001. Within the total audited world market, Lipitor is the top-selling drug in 2002, with \$8.6 billion in sales, compared with \$7.0 billion in 2001. The cholesterol-lowering drug Zocor is ranked second, up from third place in 2001, with \$6.2 billion in sales and 13% growth. Losec/Prilosec, the second-ranked drug in 2001, was the #3-selling product last year, with \$5.2 billion in sales, a 19% decline from 2001.

Of the ten best-selling drugs in 2002, the fastest growth, worldwide, was for Zyprexa, a schizophrenia and bipolar disorder treatment. Sales rose 21% to \$4.0 billion. Details: www.imshealth.com

blood group serology

transfusion incidents.

The SHOT analysis also shows that the error rate during mass blood donations is very low. According to the authors, a carefully implemented quality management system (comprehensive validation of processes) and full automation of tests, including documentation, helped to lower error rates significantly.

As only 35% of English hospitals reported (2000) that they had auto-

mated their blood group serological examinations, the SHOT analysis concludes that the implementation of full automation could reduce the incidence of human error in hospital laboratories significantly.

Recent developments in equipment and technology not only fulfil requirements for more safety and certainty in testing and documentation, but they also meet the special standards required in hospitals.

These include:

- The highest level of flexibility through random access. With patient diagnostics in hospitals, unlike with donor diagnostics, it is not normally possible to combine individual samples into large test series; moreover, test profiles in hospital patient diagnostics are normally much more comprehensive and more heterogeneous.
- In daily hospital routine it is important that quick testing of

emergency samples is given the highest priority and that full automation is constantly available, so that results can be achieved quickly even when there are staff shortages or lack of staff outside routine working hours.

- The presence of long-term storage of patient data and results, for comparison of new and old results and to check for discrepancies, as well as communication with IT systems, enhance the suitability of automation concepts for hospitals and, in future, will help to reduce the number of transfusion incidents.

Outlook - Whilst molecular-biologi-

cal methods for routine typing are increasingly used in transplant diagnostics and other medical fields - with serological methods moving into the background - classical methods, such as agglutination or solid phase techniques combined with automated solutions, will continue to play an important role in routine blood group serology. Molecular biological methods or chip technology will only be of significance for very specific examinations such as determination of very weak Rhesus-D features to D-partial antigens, within the area of donor and prenatal diagnostics in forensic medicine.

BioAnalytica 2003

1st International Trade Fair and BioAnalytica Conference

Live 'drug transporters' - bacteria that deliver medication to targeted body areas; a coating for tooth implants that promotes bone growth; biochips to test the potential effects of a medication on particular patients, and miniature genetic point-of-care testing laboratories (POCT) for use during medical emergencies, were among exciting developments demonstrated by 270 exhibitors from 14 countries at BioAnalytica.

The event, held in the New Munich Trade Fair Centre (April 1-4), is an offshoot of Analytica, organised by Munich International Trade Fairs (MITF). Covering the entire spectrum of life sciences, Analytica has quickly become a leading European attraction, said Klaus Dittrich, MITF's Managing Director. Visitors included service providers, and biotech specialists, industrialists, politicians, investors, and policymakers. Communication and networking were encouraged in a variety of meetings.

Human resources

A series of events, organised with the Association of German Biologists (vdbiol) and others, also offered advice about careers in the biotech industry and promoted personal contacts between job seekers and industry representatives.

About 32% of all BioAnalytica exhibitors are from countries beyond Germany, including the USA, Canada, Great Britain, Switzerland, the Netherlands, Scandinavia, France and Japan, and, during a lively 'European BioRegions Day' (involving representatives from Eastern Europe, Germany, France, Great Britain, Italy, Austria and Switzerland) there was a lively panel discussion about international competition.

The two-day BioAnalytica Business Conference focused on factors that determine business success in this advancing industry. Experts from economic, scientific and political sectors discussed trends and application as well as financing strategies, stock assessments, strategic alliances and partnerships, with a final discussion examined Europe's international role in biotechnology. (Not to be missed next year!)

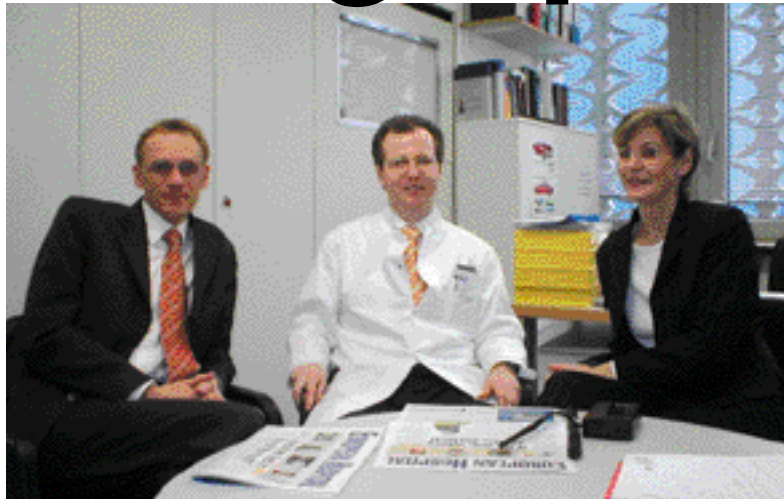
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MI TREATMENT FOR benign prostatic hyperplasia



Dr Andre Roggan, Dr Markus Mueller and Denise Hennig

EH: What is the difference between bipolar, radio-frequency induced thermotherapy or RFITT, as developed by Celon, and the conventional minimally invasive (MI) transurethral prostate resection with high-frequency resection loop (TUR-P)?

Markus Muller: TUR-P is the gold standard for the endoscopic treatment of benign prostatic hyperplasia, but this is not really a MI intervention. RFITT is not in direct competition with TUR-P, but it competes against other MI procedures - mainly in laser technology. Although the buzzword laser is very modern and mainly has positive connotations, there are disadvantages associated with laser procedures, which can be overcome with RFITT.

EH: What are the disadvantages?

MM: During a laser procedure, the surgeon gains little or no feedback from tissue and doesn't know

whether the dose used for tissue coagulation is actually sufficient. With RFITT, the great innovation is that, due to bipolarity, the equipment itself determines how long the coagulation procedure should last and can therefore be used with more precision.

The system has a function that measures the resistance of treated tissues as the current is applied. We know that this resistance correlates with the treatment's progress, i.e. with the extent of the currently treated area. So the resistance is a direct benchmark for the therapy's progress. During surgery, the system gives an acoustic feedback signal and the surgeon hears how the therapy progresses. At the end of the procedure, the machine switches itself off and gives the surgeon an acoustic signal - so he can be sure that tissue in the area where the equipment is currently being

An interview with Dr Andre Roggan, head of research and development at Celon AG, and Dr Markus Mueller, consultant at the Urology Clinic at the University Clinic Benjamin Franklin, Free University Berlin. Venue: 1st International Workshop on Radio-frequency Induced Thermotherapy (RFITT) for the treatment of BPH

applied has been completely coagulated.

Apart from the acoustic signal, the temperature indicator, at the top of the probe, has another control function for the operator. The surgeon receives a direct feedback on the temperature development in the surgical area. The temperature is indicated on a

monitor, in the operator's direct field of vision, so the surgeon has twofold control during the whole operation.

EH: Very gentle for the patient...

MM: Yes, and - depending on a patient's anamnesis - the procedure can also be carried out under local anaesthetic. Through optimum positioning of the flexible probe

(puncture depth marking, temperature sensor and visual control) injuries and complications can be avoided.

EH: Could the temperature rise too far?

MM: Not at all! This is usually a problem in laser therapy when the length of application is based on previous experience. Too much laser and the tissue carbonises, so not enough energy gets into the tissue, which means that not enough tissue has been removed. This cannot happen with RFITT, because we can apply therapy for precisely the right amount of time. It is more exact and much faster than laser therapy, and more



A new cutting mode for TUR-P

Dry Cut, a new cutting mode produced specifically for transurethral resection of the prostate (TUR-P), has been launched by Erbe Elektromedizin, of Tübingen, Germany. This, with High Cut and Auto Cut, means that Erbe's VIO System now offers the entire range of cutting qualities needed for TUR-P, TUR-B and TUR-V-P procedures, the firm reports.

The Dry Cut mode minimises bleeding during TUR-P and effective coagulation of vessels during cutting means the risk of absorption of irrigating fluid (TUR syndrome) is also potentially reduced, the firm points out. 'Visualisation

The bipolar electro-surgical instrument Erbe BiClamp, for use in open surgery

at the surgical site remains clear for an extended period, due to the limited formation of gas bubbles during cutting. In addition, reliable haemostasis significantly reduces procedure times, as repeat coagulations are rarely required. Automatic power regulation produces a maximum effect with minimal power output. Adjacent structures are spared as much as possible and wear and tear of the instruments are reduced.'

'These qualities are not achieved at the cost of an increased energy output. The automatic power regulation

by the VIO electro-surgical generators keeps power output low while still achieving the best possible haemostasis,' Erbe adds. 'Just as the VIO System can be configured for urological procedures with special software and output sockets, the system also can be individually customised for use in all other surgical specialities,

The Erbe BiClamp

The firm has also launched a new instrument for the safe coagulation of vascularised tissue structures, such

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device for „non-surgical“ painless treatment of hemorrhoid illness, no local anesthesia or special pre-operation preparation is required, immediate relief of pain and inconveniences, instant, excellent and long lasting result, treatment in surgical and gastroenterology out-patient departments, more than 80.000 patients successfully treated.



Hemoron® monopolar unit was successfully presented at the congress of coloproctology in São Paulo, Brazil 2000, the 8th Biennial Congress Council of Coloproctology in Prague 2001, at the trade fairs MEDICA Düsseldorf, Prago Medica in Prague, MEFA Brno and Middle East Health in Abu Dhabi

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comfortable for the patient, due to the shorter treatment time and less time spent under anaesthetic. All of which also makes things easier for the surgeon - and it's more cost-effective because it takes less time for us to carry out the procedure.

Andre Roggan: A further safety mechanism for the surgeon and patient is the performance and process regulation, which is independent of impedance and allows us to achieve reproducible coagulation figures. The system is characterised by its bipolarity - two electrodes, enabling current flow, are combined in one instrument. This means that electric current flows only in the precise area, and only this area heats up - as opposed to the classic HF surgical instrument with a single-pole connection. This means that the electric current flows through the whole body and can, in certain circumstances, cause vegetative irritations or burns near the conduction electrode. Single-pole HF technology cannot be used on patients with pacemakers - but our bipolar RFITT can be used without any problems.

EH: Are there further innovations for this technology in sight?

AR: There are always challenges. We can ask whether it is possible to reduce the number of necessary punctures; whether it will be possible to remove larger volumes in a shorter period of time, or whether efficiency can be increased to reduce operating times - less strain on the patient and lower costs. There is also the possibility that the procedure could be used in other medical fields.

We are already working on procedures for tumour treatment - the first probe for this is already in use, but not in urology. Another field will be ear, nose and throat (ENT) medicine. The probe used there is based on the same RFITT technology used to treat tumours - previously treated only palliatively. We also have projects based around liver metastases and liver tumours. So, we have a lot to do.

as the mesentery, peritoneum or omentum prior to cutting. Erbe reports that preparation, dissection and supply of individual vessels usually can be dispensed with, because coagulation is quick and effective. The procedure can be carried out during open surgery as well as laparoscopy. The Erbe VIO System supports BiClamp via specific software and hardware.

Tissue to be separated is grasped by the branches of the BiClamp and coagulated. The VIO software provides effective waveforms and voltages for an optimal coagulation result. The patented Auto Stop function automatically halts coagulation while ensuring safe haemostasis and thereby preventing lateral thermal damage. The instrument is then opened and tissue within the visibly coagulated area is separated mechanically. In the case of highly vascular structures it may be helpful to carry out two BiClamp coagulations, one next to the other, and then to separate the tissue between the coagulation seams, the firm adds.

'Coagulation with BiClamp is so effective that an additional ligature or a supplementary conventional coagulation is often not required,' Erbe concludes.

FDA clears vaginal oestrogen therapy

USA - The FDA has approved Femring, the first vaginal oestrogen product designed to treat menopausal hot flushes and vaginal symptoms. Developed by Galen Holdings, the flexible ring delivers oestrogen at a constant rate over a three-month period.

... but holds on hypogonad treatment

Meanwhile, an FDA decision regarding approval for Tostrex testosterone gel, made by Cellergy, was postponed by 90 days (till June), to allow time to review study data submitted by the firm in January. Tostrex is an investigative once-daily treatment for male hypogonadism, in which the testes do not function properly. The firm's Tostrelle, a testosterone gel to treat female sexual dysfunction, is in a Phase II/III clinical trial in the US.

EU okays Levitra

The European Commission granted marketing authorisation for Levitra (vardenafil HCl), from GlaxoSmithKline and Bayer Pharmaceuticals. The firms will now launch the oral treatment for erectile dysfunction in major European markets. Levitra received tentative approval in the USA last July, but has not been approved.



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By Alexandre R. Zlotta, Department of Urology, Erasme University of Brussels, Belgium

Prostate cancer, the most common neoplasm in men, often progresses from an androgen-dependant state (and is commonly treated by androgen ablation therapies) to a hormone-refractory stage, therefore making hormone therapy ineffective. The response duration to androgen ablation therapy is finite and ultimately most prostate cancer will become hormone-insensitive.

Therapy of hormone-refractory prostate cancer has been very disappointing for both patients and physicians. If hormone-refractory prostate cancer is dominated by osseous metastases, leading to bone pain and pathological fractures, nowadays many patients present with rising serum PSA values alone despite hormone therapy. Thus tumour burdens may vary substantially between patients, although all are termed as having hormone-refractory (or resistant) prostate cancer.

Until now, hormone-refractory prostate cancer was considered non-curable and most forms of treatment aimed only at improving the quality of life of patients who commonly had painful bone metastases at this stage. Indeed no effective standard treatments are currently available for patients with hormone-refractory prostate cancer. Median survival is around one year from onset at that stage.

Recently rapid advances in the management of hormone-refractory prostate cancer have been achieved and new therapeutic modalities are investigated.

We present here the significant and most important aspects of these improvements in hormone-refractory prostate cancer.

a) Prostate cancer is not chemoinensitive as previously thought
Recently large, randomised studies have confirmed a role for systemic

chemotherapy for hormone-refractory prostate cancer.

Previously, hormone-independent prostate cancer had not generally been treated with chemotherapy, except for palliation of symptoms, since no chemotherapeutic agent had been shown to lengthen survival significantly.

asymptomatic patients when the tumour burden, is logically smaller than in extensive disease. However most studies failed to observe significant differences in median survival.

Combination chemotherapy with paclitaxel, estramustin and carboplatin is one the many investigated. Other regimens have

been used in many rheumatic diseases to alleviate pain but they also play a key role in oncology. Zoledronic acid, a new powerful biphosphonate, has been studied in a randomised, placebo-controlled trial in patients with hormone-refractory prostate cancer to prevent skeletal complications. At a dose of 4mg, zoledronic acid



hormonal therapy.

Two years ago, a randomised study using doxorubicin and strontium, in a selected group of patients with advanced androgen-independent prostate cancer, was among the first to demonstrate a significant benefit in terms of survival (28 months versus 14). Strontium-89, a radioactive analogue of calcium selectively irradiates metastatic sites in the bone, while generally sparing normal bone tissue.

c) New targets in hormone-refractory prostate cancer
Many factors have been linked to the progression of cancer and especially of skeletal metastases. The potent endothelin-1, originally purified from endothelial cells, stimulates mitogenesis in osteoblasts and decreases osteoclastic bone resorption and osteoclast motility.

Endothelin-1 is produced by prostate epithelial cells and prostate cancer cells. A selective inhibitor of endothelin A receptor (atrasentan) has been investigated in hormone-refractory prostate cancer in double-blind randomised placebo controlled trials.

Atrasentan has been demonstrated to suppress markers of biochemical and clinical prostate cancer progression in bone and shown to have a potential clinical activity for hormone-refractory prostate cancer.

Other targets include growth factor inhibitors, differentiation agents, cyclin dependent kinases, activators of apoptosis, anti-angiogenesis and immunotherapy.

HORMONE-RESISTANT prostate cancer

1. Recent chemotherapy trials in hormone refractory prostate cancer

Authors	Chemotherapy agents	Year	Number of patients	Type of trial	PSA response rate/ time to progression
Berry et al	Mitoxantrone	2002	120	Phase III	50%/8.1 months
Di Paola et al	Mitoxantrone	2002	22	PSA progression after local therapy	45%
Petrylak et al	Estramustine-Docetaxel	1999	34	Phase II	63%
Beer et al	Docetaxel-Calcitriol	2003	37	Phase II	59%/11.4 months
Millikan et al	Ketoconazole-doxorubicin vs paclitaxel-estramustine-etoposide	2003	75	Phase II	30%/16.1 months

However, new chemotherapeutic agents such as the taxanes or the combination of mitoxantrone and corticosteroids have changed these old concepts dramatically. There is clearly an emerging, renewed enthusiasm for the role of non-hormonal therapy in hormone refractory prostate cancer.

Mitoxantrone and prednisone might potentially delay time to treatment failure, especially in

included doxorubicin with estramustin.

The current trend in prostate cancer is the earlier use of chemotherapy, possibly even at the stage when prostate cancer is not hormone-refractory yet.

b) Bone-targeted therapies in androgen-independent prostate cancer

Biphosphonates, which block bone destruction and remodelling, have

reduced skeletal-related events by 11% compared with a placebo (Saad et al, 2002).

Another biphosphonate, pamidronate had already been shown to prevent bone loss during androgen-deprivation therapy for prostate cancer.

New avenues include the possible use of biphosphonates to prevent bone metastases in patients with rising PSA despite

INCONTINENCE

Requirements for absorbent products*

Various incontinence devices help with hygiene, skin damage, social problems and skin damage. These include

- absorbent products (pads, diapers, diaper briefs, bed pads)
- deviating devices (catheter, urisheath)
- mechanical devices (pessary, penis clamp, sphincter prosthesis).

Absorbent disposables (table 1) are used by about 80-90 % of patients with therapy-related incontinence. These products should offer sufficient and fast absorption plus fluid transfer and retention, and should be skin-friendly. They also need to be discreet and body-shaped, easy to handle and to dispose, and finally economical.

Table 1: Overview over product groups, indication and fixation

Product group	Indication	Fixation
Pads , rectangular (mostly without gel binder)	Minor forms of incontinence. Bedridden and mobile patients (home care)	Elastic net pants, closely fitted to the body to prevent leakage
Pads fitted, small (mostly with gel binder)	Light incontinence. Discreet care for persons who want to participate in social life	Elastic net pants
Pads fitted, medium to large (mostly with gel binder)	Medium to severe incontinence. For people who want to or must care for themselves	Elastic net pants for easy change
Incontinence briefs (= all-in-one, similar to baby diapers, highly absorbent)	Extreme urinary and every form of faeces incontinence. Absorption capacity /security high	Different fixations, adhesive tape tabs
Bed pads (available in different sizes)	Bed-ridden	No fixation necessary
Textile products (briefs or pants that can be lined with a disposable diaper)	Intensive nursing; bed protection	Different fixations

Table 2: Requirements for absorbent incontinence products; Deviation values of prescription products according to German list of medical aids and appliances and average values of brand name products

Briefs	Minimum requirements according to the German list of medical aids and appliances	Average value brand products
Total absorption capacity	750 ml	1,180 ml
Wetting	< 2 g	0.7 g
Absorption speed	3 ml/sec	5.3 ml sec

Use of incontinence devices

Incontinence does not automatically mean mental illness or inability to participate in professional or social life. Particularly when the incontinent person wants to participate in professional and social life and contributes to the medical insurance system An incontinence device must meet individual needs, and the following aspects must be considered, to select the appropriate material:

- quality and quantity of the voids (faeces? urine? both?)
- change frequency: material is changed more often in the day than in the night, i.e. a product for the day need not be as absorbent as for the night.
- Handling: for self-care patients pads that are fixed to net pants are better than briefs. Briefs are recommended for mobile patients.

* cf. Melchior, Hansjörg and de Geeter, Patrick: Qualitätsmanual GIH (Gesellschaft für Inkontinenzhilfe e.V.) Miktionsstörungen & Harninkontinenz - Diagnostik und Therapie in der (haus)ärztlichen Praxis pmi-Verlag AG, August-Schanz-Str. 8, 60433 Frankfurt/Main

2. Possible cascade of therapy in hormone-resistant prostate cancer

Confirm testicular androgen suppression - Discontinue anti-androgen therapy: anti-androgen withdrawal responses have been reported after cessation of the use of the anti-androgen. These may activate specific mutant androgen receptors cloned from prostate cancers.

Second anti-androgens - Oral chemotherapy + anti-androgen: estramustine phosphate is well-known conjugate of a nitrogen mustard and estradiol, whose mechanism of action is likely antimitotic, specifically by binding to microtubule associated proteins. Estramustine phosphate is often used in combination with other agents, then using intravenous chemotherapy (see further)

Adrenal androgen inhibitors - Aminogluthetamide, ketoconazole and corticosteroids act through this pathway (although corticosteroids may have direct actions as well). Ketoconazole is used in combination with corticosteroids. Corticosteroids are also used in combination with chemotherapeutic agents such as mitoxantrone.

Consider chemotherapy - Mitoxantrone + corticosteroids, Estramustine combinations (+ vinblastine, oral etoposide, cyclophosphamide, taxanes).

Consider using bisphosphonates during hormonal therapy and in hormone-resistant prostate cancer, to prevent skeletal events.

Radio-isotopes - Strontium for decreasing painful metastases or in combination with chemotherapy.

New targets and investigational

drugs - Anti-endothelins, CDK inhibitors, anti-angiogenesis, use of immune therapies such as dendritic cells, gene therapy protocols.

Palliative care - The current trend is the transformation of hormone-refractory prostate cancer in a chronic stage, namely in a stage not curable but which is controllable by new therapeutic agents. The next step will be the emergence of truly effective therapies with a direct impact on survival, which unfortunately has not been achieved so far with any of the drugs or agents.

E-mail: azlotta@ulb.ac.be

And finally...

Bicycles and erection disorders

Unsuitable bicycle saddles can disturb blood circulation in the genital area, thus causing erection disorders for long-distance bikers, according to a new study carried out by urologists at Cologne University Hospital. The narrower the saddle the greater the pressure on testicles. Bikers are therefore advised to use a well-cushioned and ergonomically formed saddle, adjusted to the correct height; to frequently change between standing and sitting in the saddle and to take regular breaks from cycling.

Source: The maker of a homeopathic remedy, called Virgil, made from chasteberry combined with picric acid - said to be helpful in potency problems caused by fatigue.

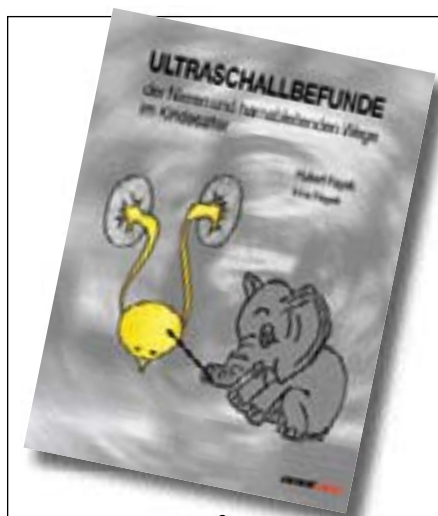


The urologist-invented 'easyseat' moves, leaving the crotch free

Drivers and cystitis

People who suffer circulatory disturbances or neurogenic problems in the pelvic region - and who spend lots of time sitting in cars - are at risk of developing chronic cystitis, which may be caused by air

conditioning set at the wrong temperature. So says a director of occupational health working for a major car manufacturer. Air streaming from the car floor can make people's pelvic floors too cold (summer) or too hot (winter) and, if the body cannot react well to temperature changes bladder inflammation can result. Although air conditioning is often overlooked in diagnosis, the health expert says it's easy to eliminate as a cause.



Learning by looking

The diagnosis of kidney and urinary tract problems can be particularly difficult when young patients are involved. Ultrasound, as the imaging choice, can provide clear images to help decide for or against surgery, thus saving time and patient stress. A new (German language) book* focusing on ultrasound diagnosis of the kidneys and urinary tract collection system in children, presents 23 cases, covering diseases that range from tract infection to varia. Ultrasound images are accompanied with brief disease descriptions and symptoms, as well as some preliminary diagnoses and therapeutic outcomes.

Heidi Heinhold, who reviewed the book for EH, concludes that radiologists or paediatricians who do not speak German could nonetheless gain worthwhile insights from this book.

* Hayek, Hubert u. Hayek, Irina: *Ultraschallbefunde der Nieren und ableitenden Harnwege im Kindesalter*. 1. ed. 2002, 188 pages and many illustrations. Pub: Omnimed, Hamburg, ISBN 3-931766-28-4. Price: 48,00 euros

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L M Bergasa, M Mazo, A Gardel and R Barea at the Electronics Department, Polytechnic School, Alcala University, Madrid, describe work on a wheelchair with a vision-based guidance system, to be controlled by the handicapped via their facial movements. This experimental, non-intrusive system, which suits all skin colours, learns the user's facial characteristics, in an unsupervised set-up. The system is adaptive and sensitive to indoor light and background changes.



Wheelchair guidance by facial movements

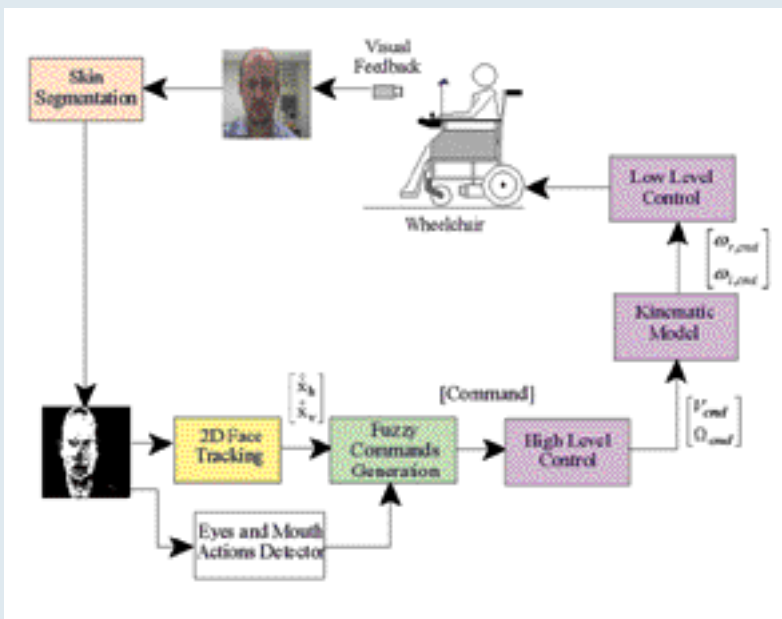


Figure 1

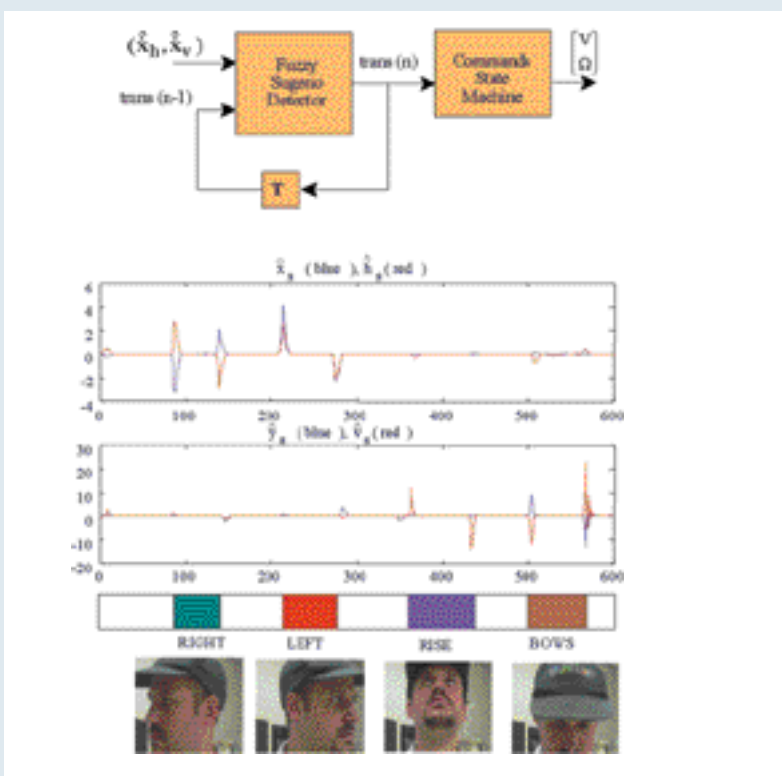


Figure 2

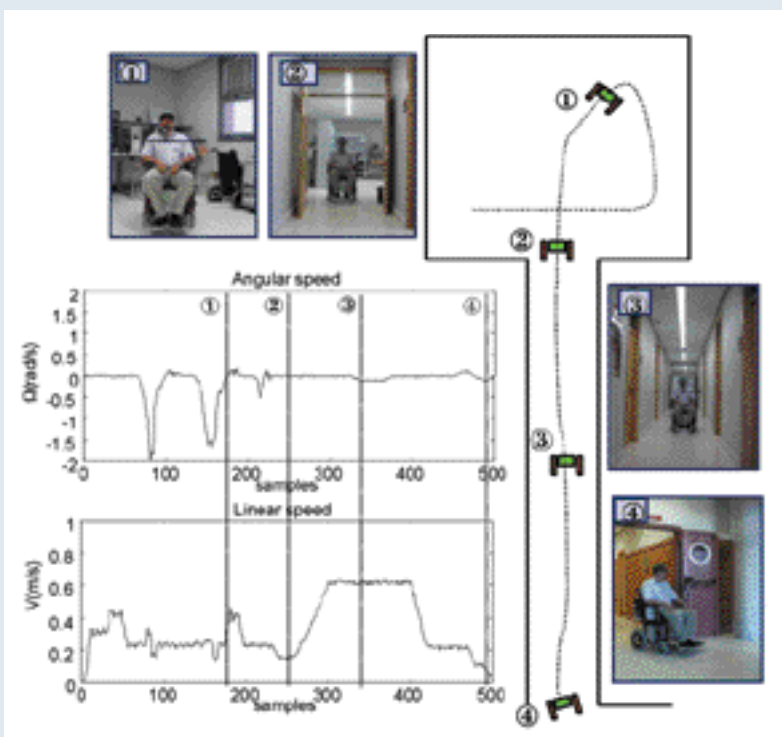


Figure 3

Visual interfaces facilitate natural and simple interfaces for human-robot interaction. Nowadays there are many applications using these, such as teleconferencing with improved visual sensation, virtual reality systems, lip readers, assistance for mobility assistance for the disabled, etc. The use of head movements and gestures offers a natural way for severely disabled people, who cannot use a joystick, to control an electric wheelchair.

System architecture (Fig.1)

Facial images are acquired via a CCD colour micro camera, placed in front of the user. These are digitised by a frame-grabber and loaded onto a Pentium memory PC. To locate the head in the image, an original skin colour segmentation algorithm - the Unsupervised and Adaptive Gaussian Skin-Colour Model (UAGM) - is used. This segments any colour skin, under changing light conditions and random backgrounds, in an unsupervised and adaptive manner. To achieve this, a stochastic adaptive model of the skin colour in a normalised red, green (RG) colour space is adjusted for the user, using a clustering process. Then the parameters of the model are adapted by a linear combination of those known and using the maximum likelihood criterion. A 2D facial tracking is applied to the skin blob and, depending on its state vectors, a fuzzy detector of head movements activates the transitions of a high control state machine, which generates the wheelchair's linear and angular speed (V_{cmd}, W_{cmd}). Applying the Kinematic model, linear and angular speed become angular speeds for each wheel ($w_{r,cmd}, w_{l,cmd}$) and are sent to the low level control. At this level a PI controller has been designed to control the velocity of each wheel. A visual feedback loop can be clearly seen as the human user reacts to changing circumstances.

Fuzzy commands generation

Applying the criteria of simplicity and robustness, and taking into account the disabilities of an intended user, the estimated minimum number of commands necessary to guide a wheelchair are: on/off, forward/backward and speed commands (turn left/right and increase/decrease speed).

Head, eyes and mouth movements, e.g. hiding the lips and winking an eye at certain intervals (the latter not covered in this report), have been chosen to activate speed commands, direction and on/off commands. Thus, if the user turns his head to the right or left the wheelchair will turn in that direction. Head rising and lowering controls the increase and decrease speed of the wheelchair, commands shown in Fig.2(a); the 2D face tracker calculates the following parameters: centre of gravity (x,y), horizontal and vertical size of the skin blob (h,v), to obtain its position and orientation. A zero-th order Kalman filter is used to estimate two independent state vectors, one of them for the horizontal variation



($x_h = (x,h)$) and the other one for the vertical variation ($x_v = (y,v)$). Thus reducing computation time. Derivatives of the estimated state vectors (\dot{x}_h, \dot{x}_v) are the fuzzy inputs for a Sugeno detector with an output. It controls the transitions of the machine which is responsible for generating commands. The last transition (trans(n-1)) is an extra input that controls the rules used by the detector each time. The knowledge-base of the fuzzy system is made up of the initial calibration process that normalises all the input variables within a range (-1,1). Each input variable has three membership functions (Neg, Zero, Pos). These functions are adjusted in an experimental way and fuzzy rules are chosen by direct observation. Fig.2(b) shows a detection sequence of several head movements, as well as the temporal evolutions of the state variable derivatives used in the fuzzy detector. The state machine generates linear and angular speed (V_{cmd}, W_{cmd}) as a function of time and the command activated. Turning commands modify angular speed in fixed quantities each 100 m/s, and depending on the direction and on/off states. Acceleration and braking commands work in a similar way but with the linear speed. Speeds are saturated to a pre-arranged limit, to improve the system's security.

Experimental results and conclusions

The vision system process up to 25 images per second, with a resolution of 128x128 pixels. Ten commands per second are issued to the low level controller. The maximum wheelchair linear velocity was set at 1 m/s and the angular at two rad/s.

To increase safety during navigation, the prototype wheelchair is fitted with an ultrasonic ring and bumpers.

After some training on a simulator, eight users tested the system in the labs and corridors of the Electronics Department. The run performed by one user, and the evolution of the wheelchair's linear and angular velocity, can be seen in Fig.3. The test lasted 100 seconds, taking five samples per second. Contact: bergasa@depeca.uah.es

USERS' CONCLUSIONS

- The system is non-intrusive because it is passive
- The more the training, the less complex it is to guide
- Reduction in the number of commands permits easy wheelchair control in environments without many obstacles
- Audible feedback is included, to ensure proper command acknowledgement
- It works well in indoor environments where suitable illumination is provided. Performance diminishes as light conditions become poorer

Minimally invasive endoprosthetics



Resurfacing of a femoral head with non-cemented cup (type McMinn prosthesis)

into the femoral neck) with the new navigation procedures in actual surgery. The concrete aim of our research is the development and clinical realisation of the complete navigation for the prostheses mentioned. At the same time, we plan to minimise the access areas needed for prostheses implantation, due to the surgeon gaining better orientation from the navigation system.



A patient, aged 48, with femoral head necrosis on both sides. Surgery, already carried out on the right side, will soon follow for the left

At the first international congress on minimally invasive hip and knee replacements (March 2003), Professor P Eysel, Dr D P Koenig and Dr F Popken, described their work on developing minimally invasive endoprosthetic surgical techniques

Early in the history of endoprosthetic hip and knee joint replacements almost exclusively had cement fixations. Now the objective is to replace only the areas of joints actually affected by arthritis and which cause a patient pain.

Apart from the conventional, cemented and non-cemented, fixed total endoprostheses, in our clinic we increasingly use a 'resurfacing' replacement as an alternative. A typical indication for this may be a young patient who has developed arthritis following an accident. In that case, it is initially sufficient to resurface the femoral head and replace the cup without cement fixation, to preserve as much bone substance for any subsequent surgery that may become necessary at a later stage.

For knee joints it is possible to only replace the particular part affected by arthritis with a small incision. We use unicondylar, a minimally invasive (MI) prosthesis that allows removal of as little bone as possible and, from a biomechan-




A prosthesis after implantation

ical point of view, facilitates a very natural joint movement. This implant can significantly shorten the time it takes to restore full functioning of the affected leg, as the MI procedure also enables early postoperative follow-up treatment.


The objective and focus of our working group is to improve implantation precision through navigated use of new generation prostheses, whilst minimising access trauma. For knee joints we studied synthetic and cadaver bones, to compare the precision of the different navigation procedures and for comparison with conventional saws. With implantation of hip resurfacing prostheses, we have succeeded in placing the guide wire (which must be inserted centrally

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By Professor Werner Siebert, head of the Kassel Orthopaedic Centre, assisting surgeon Dr Sabine Mai, Dr Rudolf Kober, Chief Technology Officer at URS-ortho GmbH, and Dr Peter Heckt, Medical Director at Fresenius ProServe

ROBOT-ASSISTED total knee replacement

Total knee replacement (TKR) is a common procedure for treatment of severe gonarthrosis, but the outcome may be unsatisfactory due to primary malalignment of the prosthetic components. To improve precision and accuracy of this surgical procedure, CASPAR, a commercial robotic surgical system, has been adapted to assist the surgeon in preoperative planning and intraoperative execution of TKR

So far, 70 patients with idiopathic gonarthrosis were successfully treated with robot-assisted technique in our institution. No major adverse events related to the use of the robotic system have been observed. The mean difference between preoperatively planned and postoperatively achieved tibiofemoral alignment was 0.8° (0-4.1°) in the robotic group versus 2.6° (0-7°) in a manually oper-

ated historical control group of 50 patients. Clear advantage of robot-assisted TKR seems to be the ability to execute a highly precise preoperative plan based on computed tomography (CT) scans. Due to better alignment of the prosthetic components and improved bone-implant fit, implant loosening is anticipated to be diminished, which may be most evident in non-cemented prostheses. Current

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Movement Mapping

J Jerosch and M Schneppenheim of the Orthopaedic Surgery Department, Johanna-Etienne-Hospital, Neuss, Germany, and A Weipert and St Hanusek of Orthopaedic Services (Mainhausen), describe dynamic, pre-operative surgical planning for total hip replacement

During the past decade total hip replacements have increased, even for younger patients with degenerative joint disease. Due to new bearing surfaces, such as the ceramics-ceramics combination, the range of postoperative free movements is gaining importance, particularly for younger patients.

With ceramics bearing surfaces, the load edge needs special attention, so more precise implantation is necessary.

Apart from infection, dislocation represents one of the main postoperative complications, resulting in delayed mobilisation, extended rehabilitation time or, if recurring,

even revision surgery, which causes significant stress for patient/doctor. In recent studies, joint instability is shown to occur in 1.5-4% of all first hip replacements and revision surgery can increase up to 26%, which may have considerable socio-economic and psychological consequences.

Apart from implant positioning, the geometry of the prosthesis is decisive for a free range of movements. Thus, the prosthesis head size is as crucial for the development of a luxation as is the relation of the head to its neck. The bigger the head, the greater the freedom of joint movement, without which the

disadvantages, such as the need for placement of fiducial markers, increased operating times and higher overall costs have to be resolved for the future.

Surgical technique

Placement of fiducial markers

To facilitate orientation, the robot requires placement of a femoral and a tibial pin that serve as fiducial markers. The pin design is a self-tapping bone screw to which a special CT cross can be affixed. This will be detected by later computed tomography. The pins are placed into the femur by an anterior approach and into the tibia via an anteromedial approach (figures 1+2). The stab incisions are positioned in such a way that they can later be incorporated into the primary surgical incision. The robot uses these pins for spatial orientation and performs geometric calculations based on their location. To maintain the pins in the required stable position, they are placed bicortically. The incisions are closed over the pins and the main procedure is performed on the same or on the following day. Placement of both pins takes about 15 minutes on average. Major problems or complications were never encountered during the pin placement procedure. No stress fractures at the pin sites were observed in the follow-up period.

CT-scan and preoperative planning

A helical CT scan is obtained immediately after the pins have been placed. Particular attention is paid to the areas of the femoral head, pins, knee and ankle. A calibration rod is placed next to the extremity. The rod helps to control the CT scan quality, in terms of motion artefacts. The

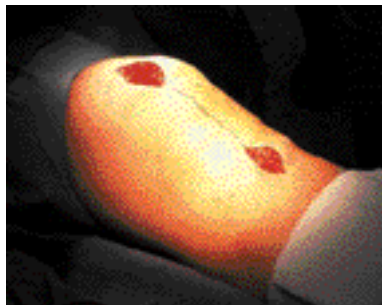


Fig 1: Stab incisions for placement of femoral and tibial fiducial marker pins are placed at the proximal and distal end of the later TKR incision

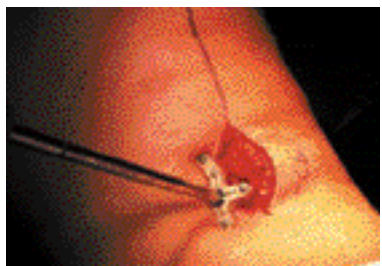


Fig 2: Fastening of the special CT cross on the tibial pin

average time for the preoperative CT scan is 15-20 minutes. During imaging, our patients are maintained under a spinal or epidural anaesthesia from the pin placement procedure, greatly reducing the risk for motion

artefacts. However, if the CT unit is too far from the operating room the CT scan can certainly be taken at any later time without anaesthesia.

The CT data are then transferred into the PC-based planning station. The scan's technical quality is automatically checked and the pin position verified. The surgeon identifies specific anatomical landmarks and the anatomical and mechanical axes of the femur and tibia are calculated in the frontal and sagittal planes. The joint line, epicondylar twist (angle between epicondylar line and posterior condylar line), torsion of the tibia (angle between dorsal part of the tibial plateau and a line through the centre of the ankle), as well as the relationship of the dorsal part of the tibia and the condylar line, serve as additional important parameters. All angles and possible geometric translations are displayed on the video screen at the end of the planning procedure (figure 3).

The system allows the user to select and position a specific implant size. One needs to decide

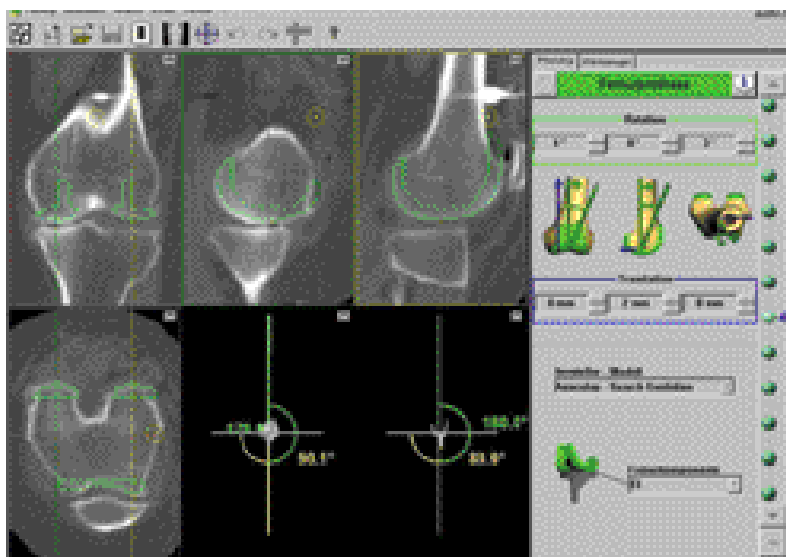


Fig 3: Original screen-shot from the planning station showing the PC-based planning of the femoral component and the resulting mechanical leg axis

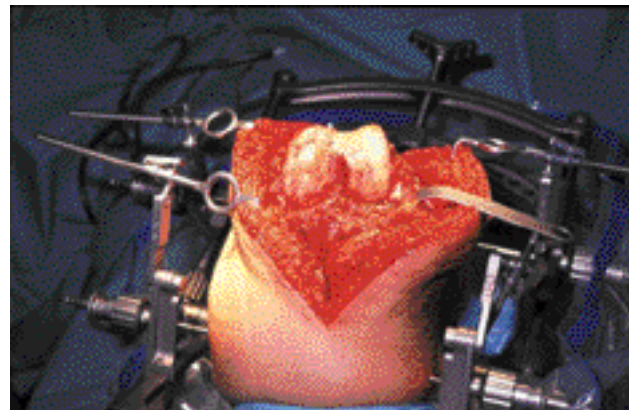


Fig 4: Intraoperative situs before machining of the femoral part. The knee is rigidly fixed in a special designed frame with self-holding retractors

on the required degree of femoral and tibial external rotation to assure central patellar tracking. Either a classical or anatomical joint line plus the amount of dorsal slope may be selected. Unintentional notching can easily be avoided. With computer-assisted planning, the strong interdependence of all parameters, including the mechanical axes, becomes quite evident. Implant fit

can be accurately assessed by scrolling through the scan - a feature that sometimes makes the surgeon 'pickier' regarding selection of a specific implant type or size. The system informs the user about the expected change in 'extension' and 'flexion gaps' and the resulting ligament tension. This feature of the planning software enables the surgeon to anticipate the amount of intraoperative soft tissue balancing.

After positioning the implants, it is important to specify the milling areas, to avoid redundant cutting and to protect surrounding soft-tissue. As a last step, the system prints out an overview of the final plan. All data are stored on a PC card and transferred to the robot control unit immediately before surgery. After an initial learning period the preoperative planning procedure requires about 15 minutes.

Fig 5: View of the working robot. Unwanted motion is detected by an infrared camera system (background) and corresponding rigid bodies fixed to the frame (foreground)



Robot-assisted surgery

A conventional median incision with parapatellar approach to the knee joint is used. The knee joint is secured by a transfemoral and transtibial self-cutting screw to a specially designed frame. This rigid frame is also used for fixation of self-holding soft-tissue retractors

continued on page 20



prosthesis neck will make contact with the acetabular edge, whereas smaller head designs tend towards dislocation due to an implant-implant impingement.

The purpose of our study was to describe the influence of implant positioning on the available movement range (implant impingement).

Via computer simulation, the movement range (Movement Mapping = MM) of a hip joint after conventional endoprosthesis was described. Only head length (length M) and diameter (28mm) were constant measurements in this analysis. All other geometrical parameters were variable.

continued on page 20



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continued from page 19

(figure 4). Sufficient mobility to allow 50° ipsilateral hip flexion is a prerequisite for securing the leg in the fixation frame. Intraoperative difficulties can be caused by a very tight quadriceps muscle or patellar tendon.

Since it is necessary to provide sufficient lateral traction on the patella to keep it out of the way when milling the tibial plateau, a temporary release of the tibial tuberosity or a 'quadriceps snip' may be required in very rare instances. To control for unwanted leg micro-movements during robotic surgery, rigid bodies with reflective spheres are firmly attached to the frame. The passive markers are constantly monitored by an infrared camera system, which will automatically shut off the robot in the event of excessive motion (figure 5).

After registration of the fiducial markers, robotic milling is started by the surgeon. As a safety measure, the surgeon must constantly depress the robot button on a sterile remote control, to maintain the cutting action. The cutting tool is equipped with internal water-cooling and

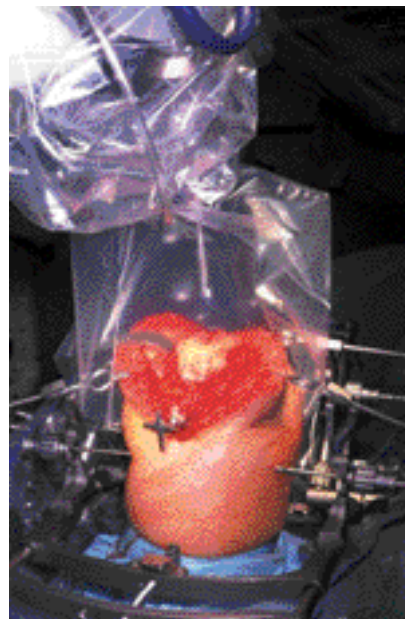


Fig 6: Knee securely fixed with cutting tool splash guard in place right before femoral milling action commences. The tibial registration cross is still in place at the distal end of the incision

irrigation. A splash-guard helps to keep the operative field and reflective spheres dry and clean (figure 6). Milling heads are changed during the procedure depending on the type of cut to be made. Varying with the size of the implant and bone density, the entire milling procedure takes



Fig 7: Final tibial and femoral bone surfaces with preserved posterior cruciate ligament

approximately 18 minutes. If required, it is possible to revert to conventional manual technique at any point during surgery.

The resulting bone surfaces are accurately shaped and smooth (figure 7). After the fixation frame and pins are removed, soft tissues are balanced in the classic

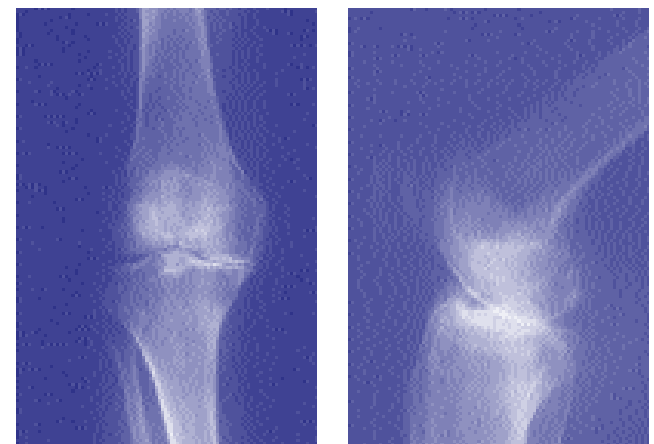


Fig 8. (a,b): Anteroposterior and lateral X-rays of a patient with medial gonarthrosis before robotic TKA

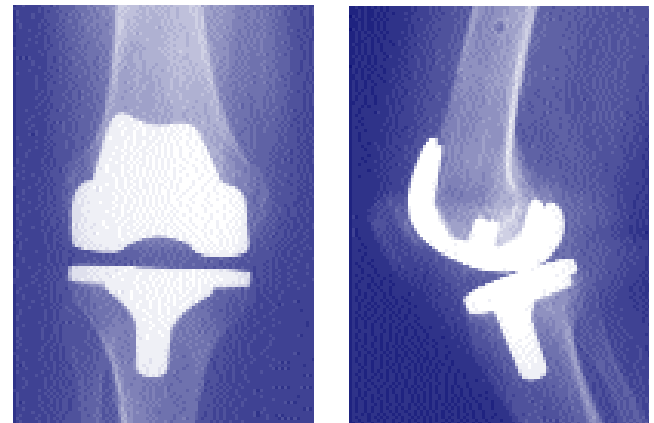


Fig 9. (a,b) Anteroposterior and lateral X-rays of the same patient after robotic TKA

MOVEMENT MAPPING
continued from page 19

A range from 35° to 55° was simulated for the inclination of the acetabulum. The acetabular anteversion was simulated from -10° to +20°. At the shaft, the CCD angle was simulated between 115° and 145° and the anteversion between -5° to +45°. The possible movement range of the thigh was analysed as follows:

- flexion: 0° - 110°
- internal/external rotation: 60° - 0° - 60°
- abduction/adduction: 60° - 0° - 60°.

The calculation is a sequential impact observation, in relation to a corresponding range of interest (ROI). This is derived from intraoperative data and from the patient's physical movement range.

The computer programme was based on Borland C++. The basis for processing individual patient data is a non-commercial programme developed by Orthopaedic Services, through which anatomically adapted endoprosthesis are developed. The platform for the whole programme is MS-DOS, but the programme also runs as a task under Windows 95/98, ME, NT and 2000. For up-to-date application, the system needs Pentium 1. Depending on the rhythm frequency, simulation time of a data record is about five minutes at 1.2 GHz, up to 4 hours at 75 MHz. The system has an open data-port for processing impingement data, with customary spread sheets (EXCEL) to represent and evaluate the data.

Results

These demonstrate that a practical model could be introduced with the virtual computer simulation. The results are plausible and correspondent to clinical experience.

Some examples of Movement Mapping (MM)

- In a simulation with a shaft CCD angle of 115° and a shaft anteversion of -5°, the motion range with an acetabular position of -10° anteversion and 35° inclination is clearly lower (above) than with a acetabular anteversion of 20° and

inclination of 55° (below).

- The free range of motion is clearly shifted with a shaft at a CCD angle of 155° and an anteversion of 45°. This is valid both for an acetabular anteversion of -10° with an inclination of 35° (above) as for an anteversion of 20° and an inclination of 55° (below).

Independent of all other parameters, the calculation of the shaft anteversion influence shows an optimal motion between 20° and

restricted mobility, it must be assumed that the implant neck strikes the acetabular edge. For several reasons, these impingement phenomena are to be regarded as a possible factor for aseptic loosening. On the one hand, the impingement happens within the artificial joint, i.e. without any ligament or muscular protection; on the other hand, the acetabulum is loaded tangentially to its sphericity. That particularly gave a biomechanically

increasingly been evaluated. With these, a precision of 0.2 mm and 0.2° can be reached. Depending on the surgical procedure, these values are probably not realistic in everyday surgical routine. Nevertheless, clearly it can be expected that the precision of the acetabulum and shaft positioning will increase.

In terms of the high precision achievable with modern navigation systems, the question of which position to aim for, remains. The literature makes the following, general recommendations:

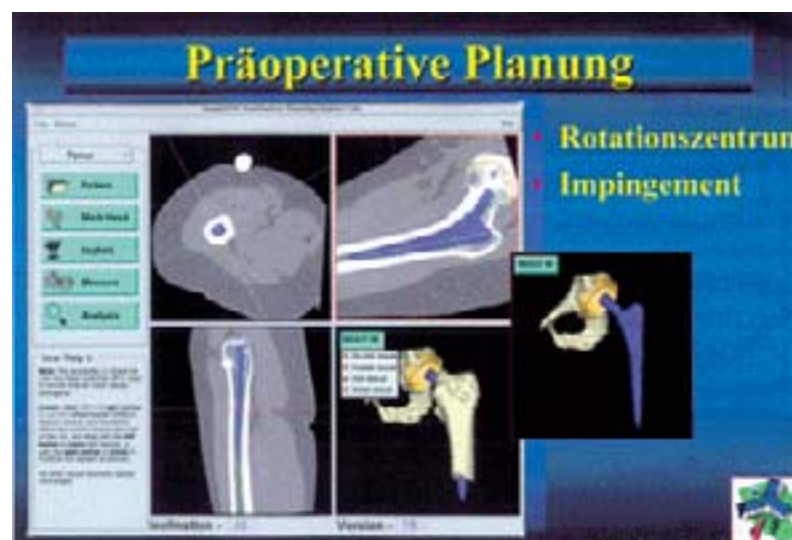
Tolerable values for the acetabular inclination are 40 +/- 5 degrees and for the anteversion of the acetabulum 5-25 degrees. For evaluation of the acetabulum the individual performance of patients as well as their load situation must be considered. The greater the proportion of sedentary activity, the greater the anteversion of the acetabulum that should be chosen to prevent posterior instability. The anteversion of the shaft should lie between 5 and 15°, the prosthesis head diameter being twice the size of the neck diameter. The bigger the implanted head, the lesser the risk of dislocation.

However, these recommendations only represent statistical mean values that need modification, depending on the individual patient and implant characteristics.

At this point, the introduced principle can be of major importance in the future. In terms of individual parameters, the optimal component positioning can be calculated for each patient, and these data are the basis for the intraoperative navigation systems. Only this combination makes the high precision of computer assisted implantation in hip endoprosthetics meaningful, so that the aims for navigation are determined not only from a surgeon's experience, but via objective data.

Unlike the purely static planning systems available until now (aimed at a fitting strategy for prosthesis components), with Movement Mapping (MM), finally dynamic surgical planning is available.

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Pre-surgical planning in progress

30°. Independent of all other parameters, the calculation of the influence of the CCD-angle shows an optimal motion between 120° and 130°. Independent of all other parameters, the calculation of the influence of the acetabular anteversion shows an optimal motion between 10° and 20°.

Analysis of the acetabular inclination shows a decreasing motion range with increasing inclination.

Discussion

The contact free range of motion has special clinical relevance for patients with an alloarthroplastic hip replacement. The theoretical angle freedom of movements of the endoprosthesis components in two vertical levels was stated for semi-circular acetabulum with 110°. However, these calculations only allow for limited conclusions about the complicated axis environment in situ. With fully or partially

more favourable spherical acetabulum at the weakest position. Thirdly, a resulting force that also has a dimension of 300 kp with everyday load is considerably high. This problem of early aseptic loosening and implant dislocation due to prosthesis positioning has been increasingly considered in literature. Out of 95 patients with unstable hip arthroplastic, Daly and Morrey discovered that unfavourable positioning of the prosthesis components was the cause in 45 patients.

In a biomechanical study and virtual computer analysis, Gondi et al. and Seki et al. pointed to the crucial interference of acetabulum and femoral component position, as well as neck length and head diameter. To avoid such failures due to acetabular impingement and to improve the prosthesis motion range, computer-assisted intraoperative navigation systems have

technique, according to the preoperative plan. The components of the implant are then inserted.

First clinical results - After a developmental phase in 1999 and a series of successful experiments on phantoms and cadaver bones, a prospective clinical study was started in March 2000 at the Kassel Orthopaedic Clinic.

The first clinical robot-assisted TKR was performed on 27 March 2000. Since then, 70 robot-assisted TKR's have been performed in 69 patients (48 women, 21 men). One female patient received simultaneous, bilateral TKR. The average age in the robotic group was 66 years (46-87 years). The manually operated historic control group consisted of 52 patients (40 women, 12 men) - average age 68 years (48-82). The indication for TKR was idiopathic gonarthrosis in all cases. The LC Search Evolution knee-system (Aesculap, Tuttlingen, Germany) was used for all patients in the robotic group, because this was the first knee implant system geometry that was loaded into the planning software. All patients in the historic manual control group received NexGen (Zimmer Inc, Warsaw, Indiana, USA) implants.

All complications during surgery and in the postoperative course were recorded. Patients were scored before and after surgery according to the Knee Society Score.

Before and two weeks after surgery, standing long-leg anteroposterior roentgenograms were taken of all patients to control for correct alignment (figures 8 a+b, 9 a+b). The mechanical leg axis was measured on these X-ray films and directly compared to the preoperative plan.

Data were statistically analysed by using a two-tailed Student's t-test. Statistical significance was assumed at a p-value smaller than 0.01.

We can foresee that surgical robots and navigational systems will be combined in the future. This approach would use the full potential of both computer-assisted systems.

Contact: wsiebert@okkassel.de

By Dirk Wetzel, medical doctor/engineer at MITI, Klinikum rechts der Isar der TU-Munich



ADVANCED THERAPY PLANNING IN hepatic surgery

The planning of hepatic surgery of primary and secondary liver tumours is a multimodal process, using modern imaging techniques - mainly contrast enhanced imaging such as CAT and MRI - depending on the patient's individual situation as well as on the experience of the medical personnel who are planning the therapy. New surgical strategies, such as segment oriented and parenchyma-saving resections of tumours and split-liver transplants, created the need for preoperative surgical planning for each individual patient.

Due to recent developments in the quality of CAT-technology, PC-based high-performance computer technology and semi-automated software for liver segmentation, virtual and interactive liver surgery planning is now generally available for surgeons. This clinical application is convincingly demonstrated by software developed as a research prototype at MeVis, Bremen, Germany, for hepatic surgery planning.

The Somatom Sensation 16 multislice scanner (Siemens Medical solutions, Erlangen) provides highly defined abdominal images, showing the liver, vessel structures and the individual lesion. It was found that the optimal ratio between signal and noise is achieved with a slice thickness of 2 mm for venous contrasted images, and 1 mm for arterial contrasted images. After anonymisation, images are transferred, by a high-speed internet connection, to MeVis for image processing and the creation of a virtual 3D model of the individual patient's liver anatomy. The software has two components: HepaVision and InterventionPlanner.

Liver and tumour segmentation are performed with a modified live-wire approach, a semi-automated contour finding algorithm. The live-wire contours are interactively determined on a slice about every 10 mm and the contours of intermediate slices are automatically interpolated and optimised. Analysis of the contrast-enhanced vascular systems utilises image filtering, segmentation of the vascular structures with a sectionally increasing algorithm, the determination of main vascular lines, and structural analysis and separation of the resulting vascular

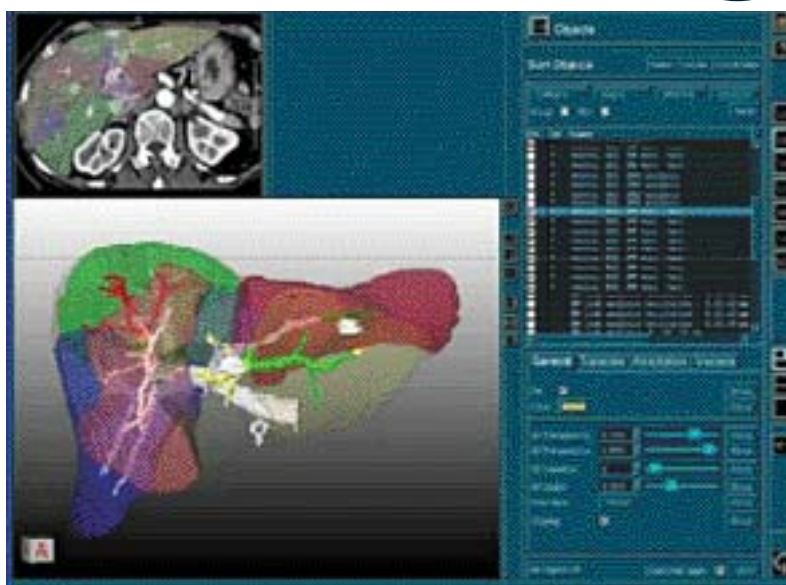


Fig.1: 3D and 2D display of the portal vein, liver segments, tumours and area at risk

trees. This analysis includes the identification of eight major branches of the portal vein, branches of hepatic veins and arterial supply, allowing for a liver segmentation of individual blood supply areas, related to Couinaud's

scheme. Vascular areas and volumes for each vascular region can be calculated separately. A risk analysis is then performed. Based on the determination of vascular structures and their dependant areas, volumetric information

can be gained for tumour resections with different safety margins (Fig. 1).

All results are managed by HepaVision and can be displayed in a freely rotating 3D model, or superimposed on the 2D slices. Image analysis takes under an hour, on average.

InterventionPlanner, the second software module, utilises the segmented data to provide interactive generation of resection

proposals, with arbitrary safety margins around the tumours and user-defined cutting lines. The volume of remaining liver parenchyma is calculated separately for each resection proposal. (Fig. 2).

The process of oncological liver resection planning is in clinical use at our institution. Virtual resection planning provided valuable information particularly for surgical decision-making in cases of more than one liver metastasis, or of tumours located close to the liver hilus. Precise calculation of the liver volume remaining after different surgical scenarios provides a perspective of potentially curable surgical interventions for an increasing number of patients.

A study of virtual surgical planning vs. the conventional approach is currently underway.

* Researchers: D Wetzel, U Stangl, H Feussner at MITI (www.miti.med.tum.de), and A Schenk and H O Peitgen at MeVis Centre for Medical Diagnostic Systems and Visualisation, Bremen (www.mevis.de)

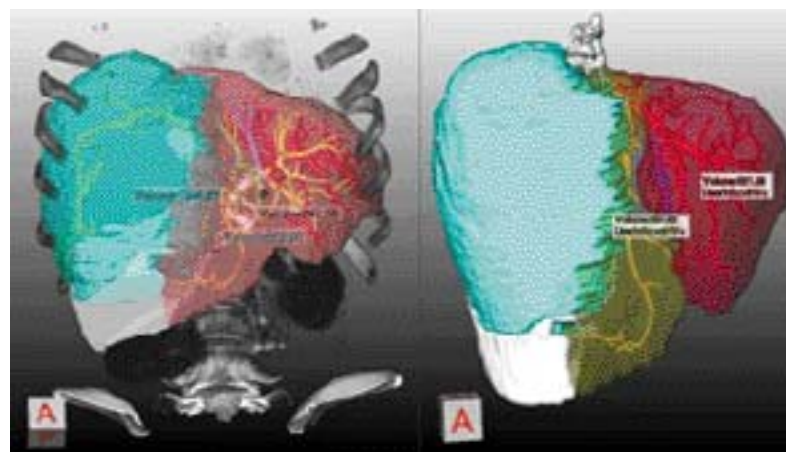


Fig.2: Resection planning: volumetric information

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Improving blade geometry

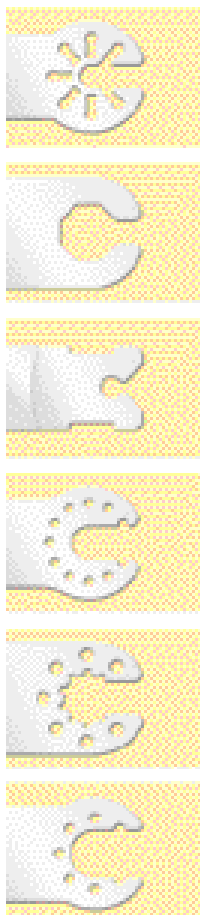


Fig. 3
Saw blades
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Komet Medical report that the firm's K-2000 saw blade has been further improved, and that a completely new blade geometry for 'Evolution' has been developed, to provide an even smoother and more controlled penetration into bone. 'An increased number of teeth ensures smooth running; blade wobbling is avoided,' the firm points out. 'The TiN-coating on the teeth (fig. 1) increases efficiency of sawing due to higher stability. The saw blade maintains its sharpness, achieving an optimum quality cut. Additionally, the coating minimises material abrasion.'

The matt and non-reflective surface eliminates reflection from theatre lights. The saw blade openings increase the field of vision during surgery and reduce heat generation. The high bending

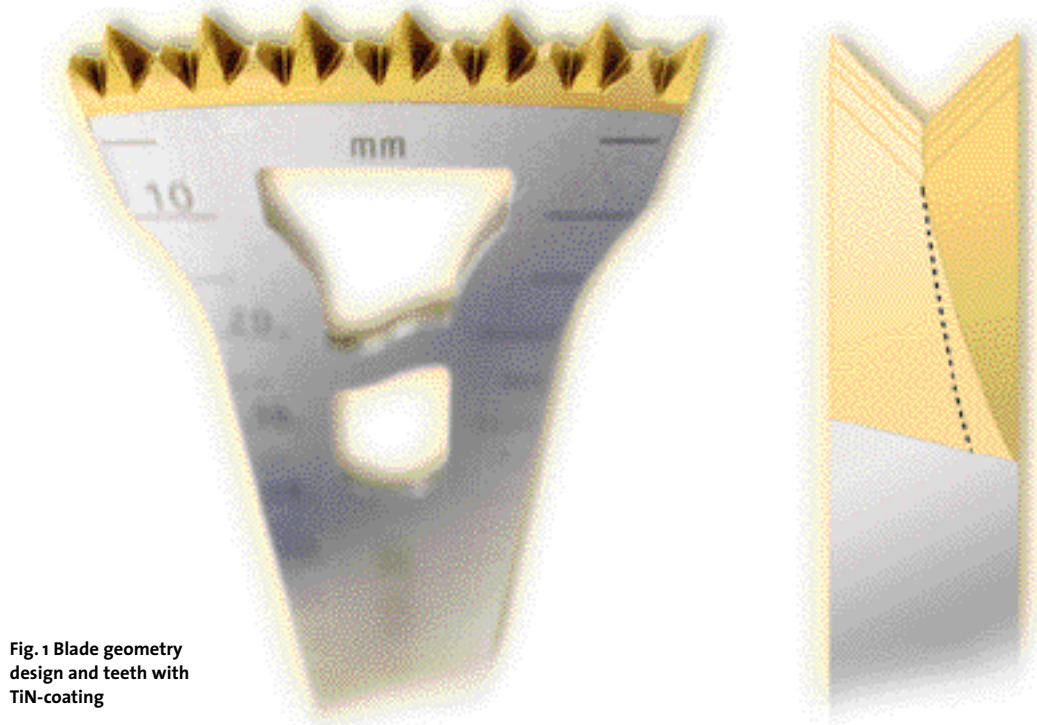


Fig. 1 Blade geometry design and teeth with TiN-coating

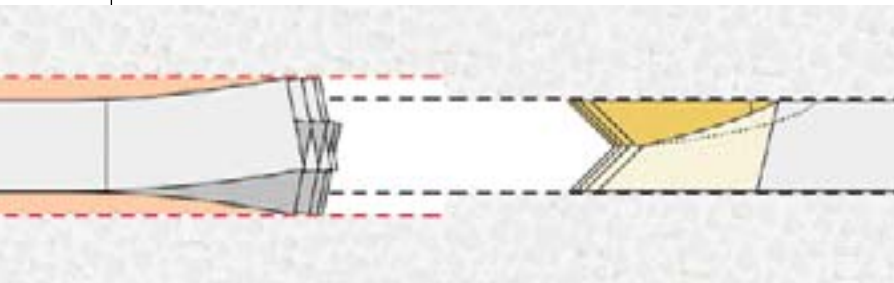


Fig. 2 Comparison of blades and cutting width. Left: standard saw blade with offset pattern. Right: Evolution saw blade (zero offset)

resistance for even, precise cuts has not changed, which allows for a precise prosthetic fit, the firm continues, adding: 'The Evolution saw blade features a uniform blade and cut thickness (zero offset) and can be optimally guided in the template allowing a perfect cut and eliminating damage or heat generation. All blade thicknesses

from 0.89 to 1.47 mm cut zero offset (fig. 2).'

For optimum results, a new saw blade is recommended for each operation, but Komet Medical says this saw blade can be used several times - until the TiN-coating starts to 'come off'; then the blade should be replaced.

A FREE sample is available

from the Komet Medical catalogue 'Evolution', which also shows a wide range of saw blades (see fig. 3) for the most popular power systems: cutting depth: 50 to 90 mm, width: 13.00 to 31.20 mm. Blade and cut thickness: 0.89 to 1.47 mm. Catalogue details: info@kometmedical.de

80% of sharps injuries are avoidable

Injuries caused by needles and other sharp medical devices - and the related risk of potentially fatal disease transmission - remain a major threat to medical staff. A film shown at a recent seminar on this subject revealed that between 60-80% of sharps' injuries are unreported and over 80% of those accidents were avoidable.

Now a campaign against sharps' injuries is underway, organised by Eucomed, along with the Standing Committee of Nurses of the EU (PCN), the European Dialysis and Transplant Nurses Association/European Renal Care Association (EDTNA/ERCA), European Medical Association (EMA), International Alliance of Patients' Organisations (IAPO), European Federation of Public Service Employees (EUROFEDOP) and European Institute of Medicine (EOM).

They are asking EU institutions to communicate clear

policy and requirements to EU Member States to ensure consistent compliance with existing EU Worker Safety and Health Directives among EU healthcare providers, and in particular:

- to provide better information/education on the risks of exposure, prevention methods and effective incident reporting
- to ensure safer working practices: use of protective clothing, safe disposal and effective response in case of injury
- to use 'sharps protection' technology, particularly for high-risk medical procedures

Dr Francisco Jesus Alvarez Hidalgo, Principal Administrator, Commission DG Employment and Social Affairs, pointed out that, in general terms, existing EU worker health and safety directives are sufficient. 'There is a good piece of legislation and if we manage to implement it, it would be a very important step forward... a current challenge is to emphasise the improvement of workers' training and awareness, the



Conventional syringes do not incorporate protective safety features

spread and diffusion of good practices and guidelines.'

MEP Mrs Malliori added: 'I think that the most difficult part in our discussion has to do not only with directives, the legislation and guidelines, but also with their implementation. Do the Member States have the facilities or the funding to react, to implement or to monitor what we decide? Usually, we are very quick with legislation and we don't care about implementation.'

Source: Eucomed

ROBOTIC SURGERY TRAINING



Robotic technology has helped to advance MIS - particularly for the very small anatomies of children. Among the newest innovations is the Socrates Robotic Telecollaboration System, which integrates telecommunication equipment, networked surgical devices and robotics, to enable remote teaching and surgical collaboration.

This spring, during paediatric endoscopic surgery training, this equipment was used in international linkups between Robert Baniqhal, surgeon at the Chris Hani Baragwanath Hospital, Johannesburg, South Africa, and Benno Ure, Professor of Paediatric Medicine at the Hanover Medical School, Germany.

The system's manufacturer, Computer Motion Inc, specialises in the development of robotic surgical systems and provides equipment to 900 customers and 3,000 surgeons in 32 countries. The firm said this was the first international use of telecollaboration to introduce this new technology and MIS procedures to paediatric

surgeons globally.

During the procedure, the operating surgeon fully controls the surgical instruments, but, via voice commands, the collaborating remote surgeon can also control Aesop, the robotic arm holding the endoscopic camera positioned inside the patient. Both surgeons see the same magnified area of the anatomy during surgery. Three procedures took place, on 1-3 year-olds,

including laparoscopy on a 2 year-old girl suffering severe gastroesophageal reflux (acid reflux). Mr Baniqhal, who is experienced in Nissen fundoplication procedures, also performed his first Thal procedure on a one-year-old boy, under real-time guidance from Prof. Ure. 'This is a fantastic way to further surgical training,' he said later.

Computer Motion also produces the Zeus Surgical System for MIS, and the Hermes Control

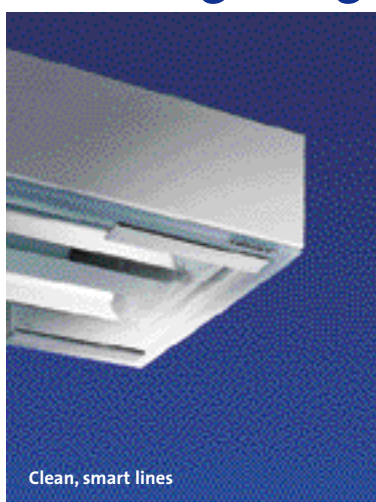
Centre, a centralised system that enables a surgeon to voice control a network of smart medical devices



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The Trilux 554... series has been designed to meet sterile demands in clean rooms. Trilux-Lenze, the manufacturer reports: 'One of the most impressive characteristics of the IP 65-rated clean-room luminaire are the variable photometric modules, which allow fully flexible adjustment of the individual lamps by +30° to -30° to the perpendicular. This enables narrow-angle, wide-angle or even an individually adjustable asymmetrical light distribution.'

'The 554... range, available in 2-lamp and 3-lamp versions, has been optimised for use of T5 lamps. Because the lamps cannot be seen directly, disturbing glare is efficiently reduced. All models are equipped with multi-lamp electronic control gear, allowing use of different fluorescent lamps with the same lengths, due to automatic wattage recognition. Dimmable variants are also planned.'



Clean, smart lines



Variable photometric modules enable fully flexible adjustment of the individual lamps

Bregenz 19-21 June

44th Austrian Surgeons Congress



The Austrian Society for Surgery and associated societies will focus on oncology/MIS, robotics - telesurgery - telepathology, bile duct/MIS, hernia surgery, neurostimulation/neuromonitoring; cell transplants and tissue engineering, at their congress taking place in Bregenz, from 19-21 June.

Additionally, participants can learn open and laparoscopic techniques for anastomoses on various simulators, modern technologies for bleeding management and tissue dissection (on various training-devices); patient-positioning in the operating theatre; stoma handling and wound management techniques (on various work stations), plus wound documentation.

In his invitation to surgeons and theatre teams, the congress president Professor G. Scinicz, points out that its theme, 'New technologies - old qualities', can be interpreted in many different ways. 'It also relates to the format of the presentations, using the very latest digital technology, but with the usual high quality content,' he added. The innovations, new findings and experiences will be discussed from scientific, medical and ethical viewpoints.

TRANSPLANTS

Antibodies halve rejection risk

Birmingham, UK - Giving interleukin-2 receptor antibodies to patients after a kidney transplant can halve the risk of rejection, according to a study published in the British Medical Journal (Interleukin-2 receptor monoclonal antibodies in renal transplantation: meta-analysis of randomised trials BMJ Volume 326, pp 789-91).

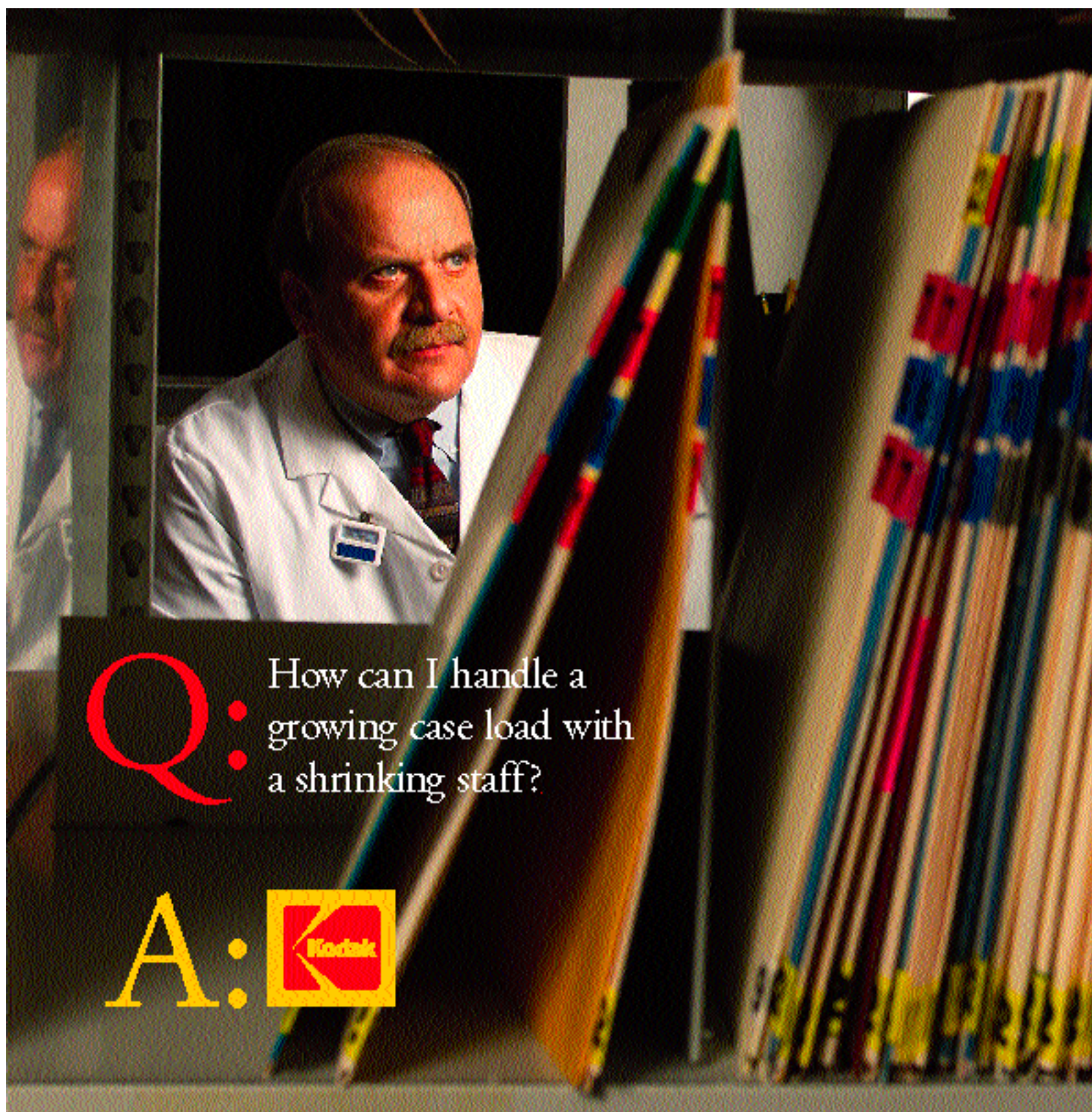
Consultant Nephrologist Dwomoa Adu, and a team of researchers at the Nephrology Department, Queen Elizabeth Hospital, reviewed eight trials of interleukin-2 receptor antibodies versus placebo in 1,858 patients receiving standard immunosuppressant drugs after kidney transplants.

Treatment with interleukin-2 receptor antibodies

reduced the risk of acute rejection by 49% after six months. Patients receiving antibodies did not have an increased risk of infection, and there were no significant differences in the rate of graft loss or survival after one year.

Reducing the rate of acute rejection is important in kidney transplantation, as patients who have had one or more episodes of acute rejection have at least a 50% reduction in long term graft survival, say the authors. They conclude that longer follow up studies are needed to confirm whether interleukin-2 receptor antibodies improve long term graft and patient survival.

Contact: dwomoa.adu@uhb.nhs.uk



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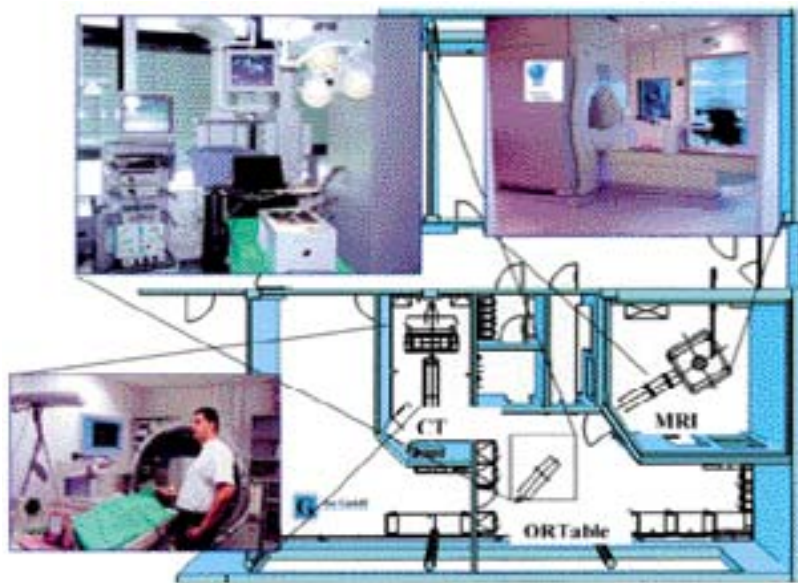
OPERATING THEATRES: the future

Innovative Technologies are the driving force behind the development of medical procedures aimed at minimum invasiveness with the highest precision and best clinical results. Advanced technologies in the Operating Theatre, such as imaging systems, robotics, computer assistance, navigation and monitoring, involve significant effort and a very high level of training and education. Because an appropriate technological qualification is not always present, severe technical mishaps and malfunction may occur, which increase the risk for a patient as well as time loss.

Generally, neither technical training facilities nor specific technology study courses are provided for medical and technical staff. Apart from the utmost safety of surgical technologies, the goals of the future operating theatre are efficacy and efficiency, which can be achieved by optimising environments with systems-oriented integration of devices, instruments and ancillary equipment. Additionally, process analysis/management, and workflow control are essential for optimum co-ordination of procedural stages and personnel, and to enable the best surgical planning and economic allocation of resources.

Such a complex operating system needs a specialised, dedicated qualification profile - a 'clinical engineer', who should have a broad technology background and appropriate competence in the basics of clinical applications, along with practical experience in minimally invasive procedures.

Professor Andreas Melzer MD, University of Applied Sciences, Gelsenkirchen, Germany, describes the world's first experimental Operating Room System for Intervention, Tomography and EndoSurgery (OT SITES)



The experimental image guided surgery OT, for R&D and education, at the University of Applied Sciences Gelsenkirchen

OT SITES

After five years of planning, the first experimental Operating Room System for Intervention, Tomography and EndoSurgery (OT SITES), for the integration of imaging technologies, was installed at the University of Applied Sciences Gelsenkirchen in June 2002.

Industrial sponsors include: Innomedic, AutoSuture, Ethicon, ComputerMotion, G-Tec, Kaldunski&L'hr; Innomedic, Imedco, Philips, Olympus Winter&Ibe, Neuromed, TecMedic, Simag, Trumpf und Richard Wolf. Finance has also been provided from university and public grants. OT SITES is dedicated to research and development (R&D) as well as projects and education (student and postgraduate courses).

Students from the Department of Physical Engineering can focus either on micro-technologies (MEMS) or health technologies.

Laparoscopic surgery, arthroscopy, neurosurgery etc. can be virtually simulated and the imaging modalities of computed tomography (CT) and magnetic resonance imaging (MRI) can be implemented. Thus, MI technologies are being further developed and the current use and

ergonomics of medical devices and ancillary systems can be analysed.

Waldemar Zylka and his team improved CT navigation, based on the Philips TomoGuide system. TecMedic, Gelsenkirchen, is developing video optic registration and navigation. Active resonant implants, such as stents and vena cava filters, including catheter and delivery systems with active MRI markers, have been realised and pre-clinically tested.

MRI compatible robotics are currently being developed in a project with Innomedic, Herxheim and FZK Karlsruhe, and pre-clinical evaluation will be performed in the MRI unit.

Inter-disciplinary projects are conducted in co-operation with other departments. Medical technologies are reviewed from both technical and economic perspectives - including DRG reimbursement options.

The Incubator Centre, FH Gelsenkirchen, is supporting start-ups.

This close relationship with industry carries outstanding potential for commercialisation of developments and the OT educational platform.

Contact: a.melzer@pt.fh-gelsenkirchen.de. Team: Waldemar Zylka, Brigitte Kipfmueller, Udo Jorczyk, Gelsenkirchen

NEW APPROACHES FOR gentler healing

Professor Horst Neuhaus MD, Head of Internal Medicine at the Evangelical Hospital, Dusseldorf, describes highlights during April's 33rd Congress of the German Society of Endoscopy and Imaging Procedures (DGE-BV)



Prof. Horst Neuhaus, DGE-BV President

Imaging for cancer prevention or early diagnosis

High-resolution video endoscopy as well as endoscopic ultrasound, zoom-endoscopy, tissue colouring and new computer- or magnetic resonance imaging procedures enable early detection of malignant tissue changes. European and Japanese experts presented a critical comparison of the technological expense and clinical benefit of these procedures. One of these new 'bio-endoscopic' procedures is fluorescence, used to light up cancerous tissue. Other technologies even promise tissue differentiation in real time, i.e. during endoscopy. With laser-supported technology, even single cells can be seen endoscopically, which means tissue can be more precisely removed and diagnosis often can be carried out during an examination.

Endoscopy for which cancers? Endoscopy is increasingly used for diagnosis, treatment and organ preservation, in pre-cancerous growths and the early stages of cancer, and new techniques of tissue abrasion or destruction have been developed for this. Almost every other stomach cancer is treated in this way in larger Japanese hospitals. German cancer centres lead in the diagnosis and endoscopic treatment

of early stage cancer of the oesophagus caused by gastroesophageal reflux. The development of colon cancer can be largely prevented through early colonoscopy and preventive removal of any polyps that may be pre-cancerous growths. Based on conclusive studies, costs for preventive colonoscopy for patients, aged 55+ years, are now born by medical insurers.

Capsule endoscopy - Experts described results and experiences in various European countries. In this exploration, a patient swallows a miniature camera, which transmits excellent images, particularly from the small intestine - previously not accessible for endoscopy. Patients with bleeds from undetermined sources and those with inflammation or tumours of the small intestine particularly benefit from this procedure. **Crohn's disease** - Endoscopy, and other imaging procedures, as well as capsule endoscopy (recent studies) play a very important role in Crohn's disease diagnosis.

In difficult cases, great progress has been made with a substance called infliximab which blocks an inflammation mediator (TNF-a). New data shows that the success of therapy and further prognosis can be judged reliably through endoscopy.

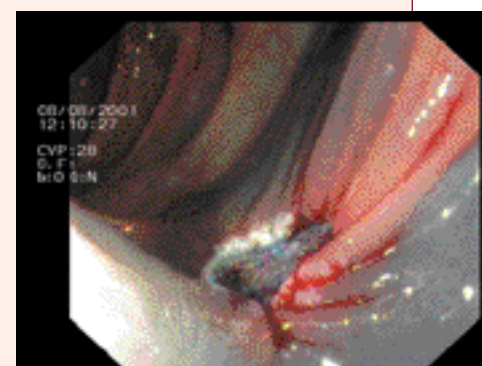
Endoscopic diagnosis with tissue colouring: an 8mm, pre-cancerous growth (flat adenoma) in the colon



Reflex - About one in ten Germans suffer frequent heartburn due to gastroesophageal reflux. Less commonly known is that night reflux of acidic stomach contents can lead to laryngitis, hoarseness, chronic coughing and asthma. The cause of these symptoms is often not recognised by doctors. Reflux can be treated with drugs, newly developed endoscopic procedures or laparoscopic surgery - but the choice is not easy and individual patients need interdisciplinary advice. In one in ten of frequent heartburn sufferers, reflux destroys parts of the mucous membrane in the oesophagus, which is then replaced by Barrett's mucous membrane. 'Barrett's oesophagus' increases the cancer risk.

Video endoscopy, and other complementary therapies, play an important role in diagnosing, monitoring and treating this disease. Reflux case studies were presented in an interactive forum, and a computer-controlled voting system (TED) recorded reactions to controversial issues. Gastroenterologists, surgeons, ENT specialists, etc described recent studies.

Technology and operating theatres - The latest imaging procedures, some only in research laboratories, were presented in a technology symposium. They included miniaturised instruments, navigation or robot supported interventions, textile substances, paramagnetic nanoparticles etc, and microstructures and neuro-



After endoscopic removal: view of blue coloured, deeper lying structures of preserved intestinal wall

computers, with an ability to learn, that function as visual aids for blind patients.

Surgical remote control, via robots and electronically connected instruments (joysticks), now allow a surgeon to sit in a relaxed position as he works via onscreen images transmitted from miniature cameras that are guided to the exact surgical site.

Such technological developments will affect the way we plan the layout of the future operating theatre.

Endoscopic surgical procedures, performed on consenting patients by international experts in their fields, were transmitted live from the Evangelical Hospital Dusseldorf to the Congress Centre Dusseldorf via satellite.



AIRLINE TESTS IN-FLIGHT TELEMEDICINE

Lufthansa - the first airline company to offer high-speed broadband internet connection for data transmission - has used the trial phase of its new in-flight internet service, Lufthansa FlyNet, to test telemedicine potential on board. A patient's vital parameters (e.g. blood oxygen levels and ECG) can be transmitted from an aircraft to a ground station, for diagnosis and returning medical advice for crew or a medical professional on board to treat a patient appropriately. In critical cases, the firm says, information from the ground station will enable a pilot to decide whether to divert to another airport.

Lufthansa conducted the tests in co-operation with the German Aerospace Centre (DLR). Doctors at

DLR checked the suitability of different prototypes of medical equipment under real conditions on a number of flights between Frankfurt and Washington. 'This project fits in perfectly with our longstanding commitment to aviation medicine research,' says Professor Uwe Stueben, head of Lufthansa's Medical Service.

In addition to an in-flight medicine chest, first aid kit and well-equipped doctor's kit, Lufthansa carries defibrillators on all long-range aircraft. These are used to help the crew to resuscitate passengers in the event of sudden cardiac arrest. Lufthansa also works with International SOS, a specialist service provider offering round-the-clock emergency medical support.

War stops the show

LUXEMBOURG - The Telemedicine Trade Fair 2003, scheduled to run from 9-11 April, was cancelled by the organisers, Foires Internationales de Luxembourg, just one month before the planned event. Uncertainty surrounding the (then impending) armed conflict in Iraq and world economic concerns were blamed, as they affected confirmation from would-be participants.

However, the organisers pointed out that details of educational programme and some planned presentations and sessions, with contact details, will remain on www.telemedicine.lu.

The next event will take place in Luxembourg next year (21-23 April 2004)

Will you win?

The Eurographics 2003 Medical Prize?

The role of computer graphics is helping to revolutionise medical treatments, and this prize acknowledges this and aims to encourage further development. Submission deadline June 30th, 2003 - Granada, Spain

The winner of the EG2003 Medical Prize will be announced during the closing ceremony of the Eurographics 2003 conference. The author(s) of the winning entry will receive a total prize of 500 euro.

The submission must consist of a one page description of the medical application detailing how it is making use of computer graphics. In addition, one or more of the following must be included in your submission:

- images from the application showing computer generated graphics
- a movie file of the application in use
- a runnable executable to demonstrate the application.

Package your submission in a zip file or compressed tar file and put "EG 2003 Medical Prize Entry" in the subject field of your e-mail to Dr. Nigel John.

More info is available at the Eurographics 2003 Web site.

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A NATIONAL ELECTRONIC HEALTHCARE SYSTEM

Britain launches massive and ambitious IT project

The National Health Service launches one of the world's biggest IT projects this month (April) aiming to connect British healthcare providers in 28 strategic health trusts via NHSnet. In the future, the plan 'Delivering 21st Century IT Support for the NHS: National Strategic Programme' (www.doh.gov.uk/ipu) aims to implement:

A broadband network NHS trusts, primary care trusts and specific health authorities will have a 2Mbps fixed link connection to the network, and all general practitioners [GPs] will receive a 256Kbps connection, thus forging links between the healthcare providers. Completion: 2004.

Electronic prescriptions Three pilot trials, in partnerships with the private sector, were completed by the end of 2002. Trials involving GPs and chemists will continue.

Electronic appointments Presently the patient's GP contacts a hospital and the patient receives an appointment by letter. This system will enable the patient and GP, in his/her office, to choose a specialist and arrange a mutually convenient booking, and if necessary change appointments quickly.

Electronic health records The first national, electronic patient record is expected by the end of 2005, and to be a complete system 2008, evolving alongside technology advances and from experiences in pilot projects and for the users. The result should provide easier mobility in healthcare provision for patients - who will be issued with an individual NHS number. 17 communities are taking part in the NHS Information Authority's Electronic Health Record Development Implementation Programme (ERDIP), in projects looking at development of standards and practices for a 'virtual' electronic patient record.

Ultimately the aim is to enable access to records about an individual patient's diagnosis/treatment that are stored in various data bases - hospitals, GP surgeries and other healthcare facilities - where they have been examined. Given present technological limitations, initially this may relate only to regional databases.

Finance Healthcare spending on this IT system will increase, in four stages, to £1.4 billion (up 40%) this year, £1.7 in 2004, and £2.3 billion in 2005, aiming for a comprehensive system in 2008. As this massive IT project proceeds, it will be controlled by a new 'Gateway' review programme, devised to scrutinise, at five stages, the progress and economics of any large-scale public project.

'Ruthless standardisation' The Department of Health's blueprint promises 'ruthless standardisation' and to this end Richard Granger, aged 37, is heading the project at a salary of c. £255,000 per annum. His task is not easy, in part due to the obduracy of some doctors, who don't want the complication of computerisation, and others who suspect the system will be used to assess performance

Mobiles to monitor asthma and diabetes

UK - A hand-sized, electronic peak flow meter, which measures lung capacity and can be connected to a PDA mobile handset is being tested for use by asthma sufferers.

The system

Asthma sufferers will use the peak flow meter at home in the morning and evening and the system, made by e-San Ltd*, transmits the readings in real time to a central server, over a GPRS connection. An electronic patient diary on the PDA also allows the patients to enter information describing their symptoms and this data is transmitted at the same time as the peak flow readings. If no readings have been received for more than a day, a text message is automatically sent to the patient's phone.

At any time, GPs or Practice Nurses can access their patients' data stored on the server, enabling them to monitor the patients' condition with up-to-date, accurate and reliable data.

The e-San solution is currently undergoing trial in a 100-patient study sponsored by O2, which is providing the mobile phone

equipment (O2 xda) and GPRS network access.

Careful monitoring of lung function using peak flow meters improves control of the condition and reduces the risk of an acute asthma attack. However, e-San points out that most asthmatics do not always record peak flow values accurately in their patient diary (reviewed retrospectively at the Asthma Clinic every three months), and they often record nothing for several days. The new equipment could ensure monitoring and quicker essential treatment following any deterioration in the patient's condition. Clive Peggram, CEO of e-San, foresees mobile monitoring of conditions such as asthma, diabetes and high blood pressure as a future norm.

Diabetes: e-San has also developed an integrated monitoring device for diabetics, which combines an electronic blood glucose meter and a GPRS mobile phone. The patient switches the blood glucose meter on, connects the cable from the meter to the phone and places a drop of blood onto the reagent strip. Within a few seconds, the



blood glucose reading is available at the central e-San server. A few seconds later, entries from the patient diary regarding insulin dose, meals and physical activity are also available at the server, the firm reports.

This system is being evaluated in a randomised controlled trial (sponsored by the Vodafone Group Foundation) involving 100 young adults with Type 1 diabetes. Incoming readings are monitored on the server and intelligent software will automatically alert a Diabetes Specialist Nurse to support individuals when blood glucose levels have moved outside a personally targeted zone.

**e-San Ltd, based in Oxford, is a spin-off from the Neural Networks and Signal Processing research group in the Department of Engineering Science at the University of Oxford. The research group, run by Professor Lionel Tarassenko FREng, is recognised as a centre of excellence for medical signal analysis.*

Telemedicine

The European Health Telematics Association's (EHTEL) white paper and action plan for 2002-2003 states that without the creation of reimbursement processes and a regulatory framework for healthcare telematics the market for such devices will never grow. EHTEL's research shows that in most countries where healthcare is not state-funded there is no reimbursement process for telemedicine.

A recent study published in the British Medical Journal that looked at 600 cost-related articles on telemedicine found that only 9% contained any cost benefit data and only 4% met the quality criteria set for the review.

Benedict Stanberry, telemedicine consultant and chair of the European Health Telematics Association's (EHTEL) says that, even though there is a huge body of academic research on the subject, many papers tend to focus on small-scale, localised pilot studies, and are not placed in a wider context to see what the benefits, such as cost-effectiveness, could be. 'A lot of these articles wouldn't really pass muster with a qualified health economist,' he points out. 'The trouble is the champions of the technology tend to be blinkered and don't present telemedicine in a balanced way. There is a lot of talk about telemedicine that is technology-led and it needs to be clinically-led.'

Research The European Commission (EC) is trying to help by funding

AWARDS & INNOVATIONS

CT and MRI-compatible compression harness

The DynaWell L-Spine, a compression harness that axially loads the lumbar spine in the supine position, has no magnetic parts, so can be used with most CT and MRI scanners.

Closely resembling a spinal column when loaded with a patient in an upright position, this compact, lightweight system includes a compression vest attached by straps to a foot-driven compression device. Pressure exerted by the system is not placed directly on a patient's shoulders, says DynaWell International.

When examining patients in an unloaded, psoas-relaxed position (PRP), narrowing of the spinal canal could remain undetected. However, when examined in a slightly extended position, during axial compression (ACE), pathologic features can



become more visible. Use of the spinal-compression device helps detect encroachment of the spinal canal, associated with pathological changes (e.g. stenosis, disc herniation, intraspinal synovial cysts).

Clinical studies have now shown that a more specific and valid diagnosis can be achieved by using a lumbar-spine compression system rather than a traditional non-loaded PRP. Published research results indicate that, by using the compression system, the likelihood of spotting a stenotic situation in the spinal canal increased by 60-70%, compared with detection during the usual unloaded

examination. Further clinical studies are taking place at the University of Aberdeen (Scotland), Mannheim (Germany) and Rochester (USA).

Hygiene: pre-surgical hair removal



Preoperative removal of hair from an operative site is important measures for avoiding postoperative wound infections. The technology of the 3M Clippers demonstrably makes for a significantly reduced rate of infection. The new 9671 3M clipper, for pre-surgical shaving of hair, improves on the design and versatility of its predecessor, the 9602, 3M reports.

The new model, with fixed head, can be used for both wet and dry shaving and is suitable for removing head hair. It can be powered by battery (running 45 minutes) or mains, for time-intensive whole-body shaving.

The device is ergonomically shaped for easy handling, and is easy to clean, with an alcohol wipe or mild disinfectant, the firm adds.

Stand brings mobility



Made for use with all seca flat and platform scales plus bed and dialysis scales, the seca 472 mobile stand with cable remote control, provides an alternative to table fittings or wall adapters, and allows greater mobility - on five double casters, that can be locked for safety.

The height of the display, when attached to the stand's chrome-plated, stainless steel tube, can be adjusted to a height of 110 cm, so the precise value can be read when either seated or standing. A cable clip on the stand prevents the cable swinging loose or catching.



Condensation in the Watercane turns dirty water into clean drinking water

Watercane - the winner

Stephan Augustin (36), a Munich-based industrial designer, has scooped the international iF Design Award for his 'Watercane'.

Up to 1.5 litres of fresh water can be produced per day, by placing this device on moist ground. Heat from the sun evaporates the moisture, which condenses in the Watercane, forming droplets that trickle down the inside wall of the device into a collecting trough - ready for use.

Stephan Augustin chose to make the Watercane from an easily moulded plastic, Makrolon, made by Bayer Polymers. The firm says the plastic is as transparent as glass, almost unbreakable, lightweight and impact-resistant, even at extremely high temperatures, making it highly suitable for water containment in harsh climates.

'Watercane' are fully mobile and particularly suitable for flood regions, because they can float on calm water and produce drinking water. Aid in the Third World only functions if it's simple and effective.' says the freelance designer, whose winning concept goes into production this summer.

Details: www.augustin.biz

and medical insurance

By Claire Mahoney

research that carries a convincing business argument. As part of its Sixth Framework Programme for research the EC is ploughing some 3.6 billion euros into Information Society Technologies.

Andreas Lymberis, Scientific Officer in the Applications Relating to Health unit of the Commission's Information Society Directorate-General, says: 'What we are trying to do is develop a methodology that will assess the quality, cost-effectiveness and accuracy of care in these projects.'

EHTEL is hoping to highlight successful applications by putting together a matrix analysis of telemedicine which not only gives an overview of the issues but also shows applications where telemedicine is not necessarily appropriate. 'Telemedicine needs to be presented to insurers in a balanced way,' Benedict Stanberry points out. This balanced and practical approach is also a crucial factor when presenting arguments for the technology to healthcare professionals. 'In a great many countries, and certainly in Europe, telemedicine threatens to

upset referral patterns that doctors have spent a lifetime building up.'

Research problems

The trouble with telemedicine is that it is like a moving target and as the technology develops the scope for implementation in healthcare becomes much broader,' says Andreas Lymberis.

Axel Baccari, healthcare analyst at the European market research company Frost and Sullivan, agrees: 'Telemedicine is a so-called diffuse technology, in other words it is not limited to a specific area.'

Successful applications

Telemedicine applications are being developed in areas ranging from dermatology to pathology. In home care, video consultation and mobile monitoring devices can reduce lengths of hospital stays, while still maintaining care.

A recent study undertaken at Aristotle University in northern Greece used multi-media cardiac monitoring equipment that, on average, reduced hospital stays by 60%.

Telemedicine has proved vital in countries where distance and remote areas make traditional methods of

healthcare delivery very difficult.

UK company Motion-media has taken part in a project in Australia that uses videophones to send video and data signals to a Mobile Intensive Care Ambulance (MICA) paramedic or emergency department specialist, based hundreds of miles away. The satellite videophone can be connected to a range of medical devices, such as electrocardiograms, vital signs equipment, and digital stethoscopes.

The future for Europe

Some commentators predict that the general strain on European health services may end up forcing insurers to open up to telemedicine

and e-health.

Last year's European Court of Justice judgements, which ruled that patients need not obtain pre-authorization from their health insurance companies for cross-border care, may help as well.

Herve Doare, EHTEL's executive director, says, 'The healthcare insurance companies will stick as long as possible to their current position. But cross-border care is a challenge for them - it is a cultural revolution as it means that for the first time they will have to be competitive.'

*This feature (published with the permission of Campden Publishing, London) first appeared on the Hospital Forum website: www.hospitalhealthcare.com

LINK UP



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APRIL

9-11 Luxembourg
**Telemedicine & Telecare
International Trade Fair**
www.telemedicine.lu

9-13 Munich, Germany
German Congress of Anaesthesia
www.mcn-nuernberg.de

9-13 Sicily
**21st Annual Meeting of the
European Society for Paediatric
Infectious Diseases (ESPID)**

24-25 Brussels, Belgium
**Intensive Care - international
consensus conference**
www.escim.org

24-26 Mannheim, Germany
**69th Annual Meeting of German
Cardiac Society**
www.dgkardio.de

24-27 Berlin
**4th World Congress on
Controversies in Obstetrics,
Gynaecology & Infertility**

26-30 Florence, Italy
**ICNC - 6th International Conference
of Nuclear Cardiology**

26-30 Lyon, France
**6th European Congress of
Endocrinology**
www.endocrinology2003.com

29-5 May Munich, Germany
German Congress of Surgery
www.dgch.de

MAY

7-10 Karlsruhe, Germany
REHAB 2003

1-4 Buenos Aires, Argentina
**Congress of the International
Society for Non-invasive
Electrocardiology**
The XII Congress of Cardiology for the
Consultant and Inter-American Forum on
CV Prevention

8-9 New York, USA
**Valves in the Heart of the Big Apple
III: Evaluation & Management of
Valvular Heart Diseases 2003**

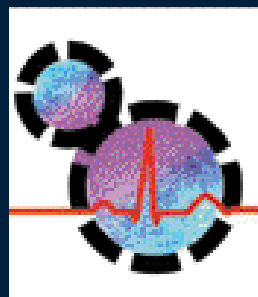
10-16 Toronto, Canada
ISMRRM

11th Scientific Meeting and Exhibition of
the International Society for Magnetic
Resonance in Medicine

18-22 Prague, Czech Republic
**2nd World Congress of the
International Society of Physical
Rehabilitation Medicine- ISPRM**

25-28 Prague, Czech Republic
**EACTA 2003, European Association
of Cardiothoracic Anaesthesiologists**
www.eacta.org

29-31 Celle, Germany
**32nd International Congress on
Perfusion**
Organised by the German Society for
Cardiovascular Engineering.
www.dgfkf.de



JUNE

1-4 Montreal, Canada
**10th congress of the World
Federation for Ultrasound in
Medicine and Biology**
www.aium.org

2-5 Verona, Italy
**37th Annual Meeting of the
European Society for Clinical
Investigation**

3 - 6 Genoa, Italy
**ESPR- Annual Meeting of the
European Society of Paediatric
Radiology**

11-14 Helsinki, Finland
**XXX International Congress on
Electrocardiology**

15-17 Lapland, Finland
**Midnight Sun Symposium on
Electrocardiology**

18-21 Nuremberg, Germany
German Congress on Anaesthesia
www.mcn-nuernberg.de

25-28 London, UK
CARS conference
www.cars-int.de

25-28 Singapore
**14th Asian Pacific Congress of
Cardiology**

25-29 Montreal, Canada
**Design and Health - 3rd WC and
Exhibition**
www.designandhealth.com

JULY

4-8 Brussels, Belgium
FEBS Special Meeting 2003
Meeting on Signal Transduction
www.febs-signal.be

12-15 Washington DC, USA
3rd World Congress on Heart Disease
new trends in research, diagnosis and
treatment

12-18 Birmingham, UK
XIXth Congress of the ISTH
International Society of Thrombosis and
Haemostasis

15-21 Dublin, Ireland
**3rd Annual International Symposium
On Translational Research In
Oncology**
info@thecbce.com

AUGUST

23-28 San Francisco, USA
33rd International Hospital Congress
www.hospitalmanagement.net

24 - 29 Paris, France
**18th WC of the International
Diabetes Federation (IDF)**
idfparis2003@congressworld.co.uk

30-2 Sept. Helsinki, Finland
**7th Congress of the European
Federation of Neurological Society -
EFNS**

30-3 Sept. Vienna, Austria
ESC Congress 2003

SEPTEMBER

2-6 Prague, Czech Republic
**4th Congress of EFIC - European
Federation of the International
Association for the Study of Pain
Chapters**

18 - 21 Rotterdam, The Netherlands
ESMRMB 2003

OCTOBER

16-17 London, UK
**eHealth 2003. Venue: Olympia
Conference Centre**
www.ehealth2002.org

19-22 Florence, Italy
**5th International Congress on
Coronary Artery Disease - Prevention
and Intervention**

19-22 Prague, Czech Republic
Europaediatrics
www.kenes.com/europaediatrics2003

23-26 Prague, Czech Republic
**3rd International Congress on
Vascular Dementia**

25 - 30 Tokyo, Japan
**10th Global Harmonisation Task
Force Conference (GHTF); 10th
Global Medical Device Conference
(GMDC)**

30-3 Nov. Amsterdam, The Netherlands
The 3rd International Conference on the
Synthesis Between Psychotherapy and
Pharmacotherapy

NOVEMBER

3-5 Buenos Aires, Argentina
**7th World Congress of
Echocardiography and Vascular
Ultrasound**

13-16 Berlin, Germany
**German Congress of Orthopaedics
2003**
www.orthopaedienkongress.de

21-24 Dusseldorf, Germany
MEDICA 2003
www.messe-duesseldorf.de

23-25 Frankfurt, Germany
**3rd International Course on Carotid
Angioplasty ICCA-II and other
Cerebrovascular Interventions**
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