CEPHADROXIL FOR ORAL ANTIBIOTIC PROPHYLAXIS IN BONE AND SOFT TISSUE SURGERY
K S NUNGU, DAR ES SALAAM, TANZANIA

In bone and soft tissue surgery, surgeons have routinely preferred parenteral antibiotics for prophylaxis. This has been considered the convenient, secure and safe route for delivering adequate concentrations of antibiotics. With limited resources but soaring medical costs, cheaper alternatives have to be promoted.

Oral cephadroxil was studied and compared with the frequently used parenteral cefuroxime. Both are cephalosporins. A pharmacokinetic study, established that peak values of cephadroxil can be attained in the blood circulation and therewith at the operation site 2-2.5 hours after intake of the oral dose. The results were not dependent on opiate premedication or spinal anaesthesia. The practical use and effectiveness of oral cephadroxil was thereafter evaluated and determined in a prospective, randomised multicentre study comprising 520 patients. After 1g of oral cephadroxil, 87% of the patients at the start and 93% at the end of surgery had attained antibiotic concentrations in the wound above the MIC-90 value for the commonly occurring staphylococci. Only one patient showed signs of superficial infection.

Furthermore penetration of cephadroxil in bone tissue was determined and found to be 3.7ug (range 28-4.9ug; 90% confidence interval). We suggest that oral cephadroxil can be used as a prophylactic antibiotic in the surgery of bone and soft tissues.

THE PATTERN OF PRE-HOSPITAL FATAL INJURIES IN DAR ES SALAAM
N A A MBEMBATI, L M MUSERU, L LISOKOTALA AND H A MWAKYOMA
DAR ES SALAAM, TANZANIA

A retrospective study was done at Muhimbili Medical Centre to determine the pattern of pre-hospital fatal injuries in Dar es Salaam. Data on age, sex and type of injury on all victims brought dead to Muhimbili Medical Centre between January and September 1997 was collected and analyzed.

There were 362 deaths due to injury occurring before arrival to hospital out of 3,043 accident victims in the same period. There were 297 males and 65 females. Most of the deaths were in the 20-39 year age group (57%).

The common causes of death were motor traffic accidents (41% of all deaths due to injury), physical assaults (21%), poisoning (9%) and burns (8%). It is recommended that a prospective study be done to determine the circumstances leading to such deaths so that prevention programmes can be instituted.

INJURIES IN AFRICA: THE NEED FOR DEVELOPMENT OF PREVENTIVE STRATEGIES
L M MUSERU, DAR ES SALAAM, TANZANIA

There is every indication that injuries both unintentional and intentional are on the increase in most developing countries including Africa. In most cases those affected are the most active part of the population and the social-economic consequences are enormous not only to the individual but also to the family and the community. Despite this, injuries have not attracted the attention they deserve, neither from medical personnel and health workers, nor
from the community and policy makers. This could be partly due to lack of appropriate data. However, because of the current high incidence of injuries in many African countries this should not be allowed to continue.

It is proposed that data on the incidence and context in which injuries occur be established for utilization by a multi-disciplinary team including medical and health workers, law enforcers, policy makers and the general population to draw up strategies for prevention of injuries in our communities.

A HOSPITAL DISASTER RESPONSE PLAN: AN EXAMPLE FOR THIRD WORLD HOSPITALS
A L MALLYA, DAR ES SALAAM, TANZANIA

When responding to a mass casualty event a hospital needs to have an organised disaster plan which spells out clearly the roles of personnel response, mobilisation of material and physical resources and re-arrangements needed to take place. This ensures rational use of scanty resource and controls panic reactions so that all casualties are identified, none are misplaced and fewer injuries are missed.

Orderly triage ensures rapid priority passage and treatment for the severely injured who are saveable and that the greatest benefit for the greatest number results. Initial assessments should be made concurrently with resuscitation.

The hospital disaster committee should meet within a week of any event to do a postmortem of the response and produce a document for reference, learning and feedback to responders. It should also organise annual mock disaster exercises.

THE ROLE OF SURGERY IN PERIPHERAL NERVE INJURIES
H-P RICHTER, ULM, GUENZBURG, GERMANY

Loss of function in the territory of a peripheral nerve following trauma does not necessarily mean that this nerve has been severed. In case of an open injury, however, transection is highly probable. In these patients the nerve should be inspected. If it is found to be sharply transected, primary repair is done in the same session (epineural sutures are appropriate). If on inspection the nerve ends are found to be ragged or contused they should be loosely approximated to avoid retraction and the wound is closed. Definitive reconstruction either by end to end suture or by autologous grafting, can be done three or four weeks later. Results after this early secondary nerve suture are not inferior to primary reconstruction immediately following trauma.

The situation is less straightforward in closed injuries which usually are due to stretching or contusion. We then wait four months to allow spontaneous regeneration to occur. If neurological deficits remain complete clinically and electrophysiologically and if the lesion is precisely localized, surgery is recommended, even in brachial plexus injuries. In brachial plexus stretch injuries, however, root avulsion from the cervical spinal cord must be excluded by myelography (and subsequent computerised tomography, if available). Cervical root avulsion is a frequent event in motorcycle accidents. Depending on the intra-operative findings and eventually on additional stimulation and recording from the nerve, suture or autologous grafting is done. The sural nerve usually serves as the donor nerve.

Physiotherapy is encouraged as soon as the mechanical resistance of the suture site is restored, that is three weeks following surgery. Regeneration proceeds slowly after peripheral nerve reconstruction, at about 1mm per day. A muscle devoid of nerve supply for 18 months will probably not regain function, even after successful regrowth of axons down to the muscle. Therefore nerve reconstruction, if indicated, should be done as early as possible. It is not justified to wait six months routinely before taking the decision to operate. This time window of six months does not concern the sensory system. Sensory end organs support much longer periods of denervation than striated muscle fibres.

The surgeon has no influence on severity or location of the nerve lesion. He can, however, influence the final result by taking the right decision in time and by using good surgical technique.

HIGH RESOLUTION MRI IN THE DIAGNOSIS OF KNEE TRAUMA
P ICKLER AND U A WAGNER, BONN, GERMANY

Magnetic resonance imaging is a useful non-invasive method for detecting specific pathological changes after trauma of the knee joint.
The experimental study revealed effectiveness in detecting meniscal tears by high resolution MRI. Experimental results using 0.5 tesla MRT (Gyrosca, Phillips) were demonstrated on 16 cadaver knee joints with artificial meniscal and ligamentous lesions. The exact anatomical reconstruction of the menisci was performed by ultrathin scanning (0.51111~1)

Axial images showed a better visualization for meniscal tears than coronal and sagittal images. Small radial tears (5mm) were detectable by axial scanning in 8/10 cases and by sagittal and coronal in 3/10 cases only. The diagnostic procedure for the cruciate ligaments and the cartilage lesions and the clinical application is presented.

**HIGH VELOCITY MISSILE INJURIES OF THE LIVER**

D M OGWANG, GULU, UGANDA

A prospective study of 15 consecutive patients admitted with high velocity missile liver injuries was done at Lacor Hospital between November 1996 and May 1997. Operative findings, treatment offered and factors influencing morbidity and mortality were noted. All patients were followed up for two months after operation.

Fourteen patients sustained gun shot wounds while one was injured by a bomb blast fragment. Ages ranged from 2 to 33 years (mean 24.4 years). Two patients sustained liver injury alone while the rest had other associated visceral injuries as well. Grade I, II, and III liver injuries were seen in 7, 5 and 2 patients respectively. One patient had bullet perforation of the liver and could not be classified on this scale. Six patients received transfusion (range 2-3 units)

Four patients (27%) developed complications, one had a sub-hepatic abscess while the other three had wound infection. Two patients died, one of exsanguination and the other died of septic shock. Missile liver injuries are associated with high transfusion rate and morbidity both of which can be minimised by a policy of conservative surgery.

**TRAUMA IN A RURAL HOSPITAL: A MEMOIR FROM THE PRE-PENICILLIN ERA**

L D STIRLING, DAR ES SALAAM

Trauma came under six headings:
1. wild beast injuries (especially crocodiles)
2. brawling in the village (usually alcoholic)
3. domestic brawling (usually adultery)
4. falls from or under trees (serious fractures)
5. agricultural accidents (various)
6. fire (often children in kitchen)

Three illustrative cases (all serious) are given of each of types 1-4 above. With no antibiotics there was urgent emphasis on sterility, adherence to general surgical principles, good nursing, and with a special emphasis on tetanus immunisation.

Of the serious cases mentioned, 50% made a good recovery, with no development of infection. The extent of an injury was less important than the time taken to bring the patient to treatment.

**HEAD INJURIES: THEIR CAUSES, DIAGNOSIS AND TREATMENT IN DEVELOPING COUNTRIES.**

P MUES, NACHINGWEA,

This report is based on experience in the management of head injuries during four years (1987-1990) in a District Hospital in the North-Western part of Lesotho.

Of 5,090 admissions to the male ward, 2,217 (44%) were due to injuries. Of the total of 3,909 traumatological patients, 2,217 (57%) were men, 966 (25%) were women and 726 (18%) were children. Of the men patients 434 (20%) had sustained head injuries, compared with only 79 (8%) of the female adult traumatological patients and 79 (11%) of the traumatised children.

During the study period, 54 burr holes and craniotomies were performed (9% of all cases with head injuries). The hospital mortality due to head injuries amounted to 8% (male 9%, female 9%, children 6%)

There exist special problems of diagnosis and treatment of head injuries under the conditions of a developing country. Diagnosis and indication for
operative treatment are mainly based on an initial clinical examination, skull radiograph and trend in level of consciousness within the first 24 hours. The stabilisation of respiration and circulation and the detection and treatment of accompanying injuries have a major influence on the further care of the head-injured patient.

The effective treatment of epi-and subdural haematomata and open head injuries with simple surgical methods were described. Rapid intervention in a patient who is still in a satisfactory general condition is essential. Once symptoms of decerebration with persistent respiratory failure have developed, few survive without artificial ventilation, even after operative treatment.

Prognosis and rehabilitation of head-injured patients in developing countries is frequently determined by careful nursing and the possibility of reintegration into the families.

COMBINED POSTERIOR TRANSPEDICULAR C2 SCREW FIXATION AND ANTERIOR ODONTOID DOUBLE SCREW FIXATION FOR STABILIZATION OF A COMPLEX AXIS FRACTURE: A CASE REPORT
S RATH, J F KAHAMBA AND H-P RICHTER, ULM, GUENZBURG, GERMANY

Objectives and importance
To manage surgically a combined unstable odontoid fracture and traumatic C2 spondylolysis (Hangman's fracture) with preservation of occipito-cervical junction function avoiding C1/2 fusion.

Clinical presentation
A 54-year-old patient sustained an unstable combined traumatic C2 spondylolysis (Effendi type II), and a high odontoid fracture (Anderson type III), from a fall.

Intervention and technique
Through a posterior approach, a C2 transpedicular screw fixation (Judet) was done, followed four days later by an anterior procedure in which a double screw fixation of the odontoid process was carried out. A stiff neck collar was applied for six weeks postoperatively. Bony fusion of C2 including all fracture sites was achieved after that time without impairment of head motion.

Conclusion
A combined anterior odontoid double screw fixation and posterior transpedicular C2 screw fixation is an effective procedure for the surgical management of complex unstable C2 fractures without impairment of head motion at the craniocervical junction.

SCIATIC NERVE PALSY ASSOCIATED WITH INTRAMUSCULAR QUININE INJECTIONS IN CHILDREN
E K NADDUMBA AND P NDOBOLI, KAMPALA, UGANDA

The purpose of this paper is to show that, in children, gluteal injection of quinine dihydrochloride (QDH) may result in damage to the sciatic nerve.

Forty-six children were seen with foot drop following intramuscular injections in the same limb. They were analyzed for the type of injection, injection site, route of injection, the Health Unit where the drug was administered and the personnel that administered the prescription, the type of paralysis and its duration. In 22 children, QDH was the principle drug administered. Of these, five (23%) had a sciatic palsy that persisted for at least one year. As well as the sciatic nerve palsy, some of the children developed other complications including equinovarus deformity, leg length discrepancy and trophic ulcers. We conclude that intramuscular injections of quinine dihydrochloride into the gluteal muscles in children can cause sciatic nerve palsies and that unfortunately some of these may be permanent.

ENTRAPMENT NEUROPATHIES
H-P RICHTER, ULM, GUENZBURG, GERMANY

Compression of peripheral nerves at an entrapment site eventually leads to neurological deficits. Clinical symptoms and signs are usually slowly progressive. Depending on the nerve involved, typical initial symptoms are pain and paraesthesia. Most common entrapment neuropathies are the carpal tunnel syndrome, entrapment of the ulnar nerve at the elbow, of the inferior trunk of the brachial plexus at the thoracic outlet or of the peroneal nerve at the fibular notch.

A famous person suffering from a rather rare entrapment neuropathy was Sigmund Freud who published his typical symptoms and signs of a meralgia parasthetica, an entrapment of the lateral
Emoral cutaneous nerve in the groin shortly after its first description by Bernhardt in 1895.

Underlying causes are either normal or anomalous anatomical structures of various local pathologies like ganglionic cysts, lipomas, tenosynovitis, vascular anomalies and others. The common denominator of entrapment neuropathies is the external compression of the nerve. The only exceptions are rare intraneural pathologies like an intraneural ganglionic cyst. Surgery is not only indicated if neurological deficits are present but also for complaints of pain and paraesthesia. With the rare exception of intraneural pathologies, adequate surgical treatment is the decompression of the nerve at the entrapment site without entering the interior of the nerve. In ulnar nerve entrapment at the elbow, the nerve can be transposed anterior to the elbow joint but this is not unanimously accepted as essential.

Postoperative results are usually excellent or good if the diagnosis has been correct, the operation performed in time and the surgical technique appropriate. Failures and recurrences are usually due to either erroneous diagnosis, insufficient decompression of the nerve or traumatic surgical technique.

**ESSENTIAL SURGICAL SKILLS PROGRAMME: EVALUATION RESULTS FROM 94 PARTICIPANTS**

**KAKANDE, R LEIT AND S KAGGWA, KAMPALA, UGANDA**

Most medical students categorize their curricula according to two general headings, namely Knowledge and Skills. Like oxygen and life the two are inseparable. For instance, a bright student may understand all the essentials of bone healing but if he lacks the skills to reduce a fracture and apply a plaster cast, his information is useless to the patient with a fractured limb. Similarly, although we now live in an era of specialization, critically ill patients cannot select where to go or wait for a specialist to insert a chest tube or do a tracheostomy when they have a pneumothorax, severe respiratory distress or upper respiratory obstruction.

It was from this background that the Department of Surgery joined with the Canadian Network for International Surgery to organise two essential surgical skills workshops for undergraduate medical students, postgraduate trainees, doctors and surgeons to promote the use of models and animal materials in teaching surgical skills.

In this paper we present the evaluations from 94 participants who were exposed to 38 life-saving skills and 20 critical case studies. All the students approved the use of simulators in teaching surgical skills, 41% found the course excellent, 49% rated it as very good, while 10% rated it as good. None considered the course bad.

It is recommended that a surgical skills programme be included in the curricula of all the medical schools in our region and that it is an examination subject.

**THE RESISTIBLE RISE OF SURGICAL SEPSIS IN SUB-SAHARAN AFRICA**

**C LAVY, E KALUA AND J PHUKA, BLANTYRE, MALAWI**

The operating log books of five hospitals in Zambia and four hospitals in Malawi were analyzed for the period from 1976 to 1996. The operated cases were divided into 'septic' and 'non-septic' according to the description given in the operating log. The septic cases were then expressed as a percentage of the total number. In most hospitals studied, the percentage of septic cases increased over the 20 years by a factor of around three. The increase was slow between 1976 and 1986, but rapid between 1986 and 1996. The possible reasons for such an increase in septic pathology were discussed, as were the implications for the countries involved, and their health services. In particular it was pointed out that the large increase in septic pathology reduced the already small amount of time that could be spent on elective surgery.

**HOW COMMON IS BREAST DISEASE? A REVIEW OF THE FIRST 15 MONTHS OF A SPECIALIST BREAST CLINIC IN MALAWI**

**M R WEEDON, BLANTYRE, MALAWI**

Most patients with any form of breast disease tend to present late in Malawi. The 10-year figures for breast cancer are presented. Working on the hypothesis that these figures are misleading, the
female staff of the teaching hospital were circularized with a leaflet in their language, teaching and encouraging self breast examination and a specialist clinic for breast disease commenced. The 15-month experience of this clinic is presented.

**RISK FACTORS IN BREAST CANCER INVESTIGATED AMONG AN AFRICAN POPULATION**
H AMIR, C K MAKAWAYA, M R AZIZ AND S JESSANI, DAR ES SALAAM, TANZANIA

In the Western world numerous studies have investigated various aspects of breast cancer including the different risk factors associated with this malignancy. Despite female breast cancer being a public health problem in sub-Saharan Africa, it has received very little attention from various national health providers in this geographical region.

This case-reference study investigated the association of known risk factors and breast cancer in Tanzanian women. Factors investigated included parity, lactation, age at menarche, age at first sex, marital status and age at menopause. Analysis of this investigation revealed strong evidence of breast cancer risk increasing with parity ($x=10.6; p=0.001$). However, lactation did not confer protection against breast cancer. Also none of the other factors studied was found to be associated with the breast cancer at any interesting or significant level.

The influence of these results are discussed in terms of its pathogenesis and possible preventative strategies.

**PEAU D'ORANGE: NOT ALWAYS A SIGN OF ADVANCED BREAST CANCER**
M R WEEDON, BLANTYRE, MALAWI

Students and doctors trained in Western countries and using standard textbooks are likely to be misled when confronted with patients with unilateral breast enlargement without palpable tumour, especially when there is peau d'orange, with or without enlarged axillary nodes. The two-year experience of a surgeon in Malawi is presented.

**LONGITUDINAL STUDY OF HELICOBACTER PYLORI-ASSOCIATED GASTRITIS**
G McFARLANE, J WYATT, G LACHLAN AND D FORMAN, CHOGORIA, KENYA

The incidence of gastric cancer among the Meru people of Kenya has been found to be 14.3 per 100,000 for males and 7.03 per 100,000 for females (World Age Standardised Rate). From this part of Kenya, a group of 101 patients with Helicobacter pylori-associated gastritis who had been examined five years previously, underwent repeat endoscopy and biopsy of five different areas of the stomach, to document any histological changes the had taken place. In 51 untreated patients, the proportion of patients with moderate to severe atrophy increased from 33% to 43%, an annual increase of 1.8%. A subgroup of 12 untreated patients with more severe gastritis and pan-gastritis showed evidence of spontaneous regression of atrophy ($p<0.05$). Intestinal metaplasia did not show evidence of progression, being present in 24% of patients in 1988-1989 and 22% of cases in 1994.

These findings failed to reach statistical significance over the five-year period. The spontaneous improvement in those with severe atrophy and the lack of progress in those with intestinal metaplasia seen in this study contrasts with the few other longitudinal histological studies published from other parts of the world. The high incidence of infection with Helicobacter pylori in Africa and relatively low incidence of gastric cancer in most parts of the continent may be due to arrest of the disease process at this stage.

**THE MANAGEMENT OF GASTROINTESTINAL ANASTOMOTIC FAILURE**
A MUNRO, CONSULTANT SURGEON, UK

Although there is a great deal of information in the surgical literature on anastomotic failure rates there is a paucity of publications on how to manage this condition. A major factor in the morbidity and mortality of anastomotic failure is the delay in making a diagnosis. If there is even a remote suspicion that anastomotic leakage has occurred, a water soluble contrast study should be performed. Although conservative treatment with antibiotic therapy and gut rest may be appropriate for a very small number of patients with localised leakage and
minimal clinical signs, patients with major leakage require surgical intervention.

An audit has been performed of 454 consecutive large bowel anastomoses performed in two General Surgical Units in Aberdeen and Inverness, Scotland. The clinical leak rate was 1.7%. One leak was identified in 189 patients who had a right hemicolectomy whereas the clinical leak rate for 291 patients who had anterior resection was 6%. Resection of the left colon and sigmoid was associated with a leak rate of 2%. The operative management of the nine clinical leaks consisted of conventional treatment by disconnecting the anastomosis and formation of a stoma in four patients who had major anastomotic disruption. In a further five, who had small defects in the anastomosis, thought to be due to poor technique, the anastomosis was salvaged by endo-anal suture of the defect in three low colorectal anastomoses; insertion of a catheter into the anastomotic defect was performed in one patient and drainage of the anastomosis alone in a further patient. There was no death related to anastomotic breakdown in this series.

We conclude that in some patients it is possible to salvage the anastomosis when there has been large bowel anastomotic failure. This is of particular importance in patients who had low colorectal anastomosis who otherwise would be committed to permanent stoma formation.

WHAT HAS BEEN THE IMPACT OF THE INTRODUCTION OF LAPAROSCOPIC CHOLECYSTECTOMY?

M H KRUKOWSKI, ABERDEEN, SCOTLAND

The impact of the introduction of laparoscopic cholecystectomy was assessed by comparing prospectively collected data on two cohorts of 900 patients undergoing cholecystectomy in a single unit. The first cohort of 900 open cholecystectomies was compared with a second group of 900 laparoscopic cholecystectomies performed since its introduction in 1990.

The outcomes in terms of mortality and consumption of resources have been collected and compared with a similar number of open cholecystectomies performed prior to the introduction of laparoscopic cholecystectomy. These show an increase in the rate of bile duct injury from 0.1% to 0.3%, a reduction in the postoperative stay from 6 days to 1.5 days, a decline in the number of operative explorations of the common bile duct, a rise in ERCP and endoscopic sphincterotomy and a fall in mortality from 1% to 0%.

The increased risk of bile duct injury, which may be unavoidable in patients with incipient Mirizzi syndrome and which has declined since the early days of laparoscopic surgery, may well be compensated for by the decline in mortality associated with the laparoscopic approach.

THE UMBILICUS: AN IMPORTANT WINDOW ON ABDOMINAL DISEASE

M R WEEDON, BLANTYRE, MALAWI

Both in acute and chronic abdominal disease, examination of the umbilicus frequently provides important diagnostic information. The author presents observations made over a two-year period in Malawi.

ENDOSCOPIC MANAGEMENT AND SURVEILLANCE OF PATIENTS WITH TRANSITIONAL CELL CARCINOMA OF THE URINARY BLADDER AT KCMC

M M ABOUD, DAR ES SALAAM, TANZANIA

Objective

To evaluate the management and follow-up of patients with transitional cell carcinoma of the urinary bladder at the Kilimanjaro Christian Medical Centre (KCMC)

Patients and methods

This is a retrospective evaluation of 43 patients with histological diagnosis of transitional cell carcinoma (TCC) seen and treated in the Department of Urology from June 1990 to July 1997.

Results

The average age at presentation was 57.7 years and all patients presented with haematuria. Severe anaemia (5%) and suprapubic mass (2%) were rarer. Most (75%) of the tumours were Grade I and II and 56% were confined to the mucosa or lamina propria. Single and multiple tumours were seen equally frequently, each in 42% of patients. The most frequent tumour configuration was papillary, seen in 75% of patients. Primary treatment in 81% of patients was a bladder-sparing procedure. Thirty-
nine per cent of patients were lost to follow-up immediately after discharge but 42% reported for the first check cystoscopy at 3 months. There were 28 repeat transurethral resections of recurrent tumours in 42 check cystoscopy from 22 patients. The salvage from transurethral resection was 42%.

**Conclusion**
Clinicopathological presentation in our series is not different from that seen in the Western countries. Furthermore, bladder sparing procedure remained the standard treatment. However, drop-out rate, recurrence rate and failure rate of primary treatment was very high. Recommendations are given to overcome this problem.

**URINARY DIVERSION IN CHILDREN WITH EXSTROPHY, EPISPADIAS AND OTHER DISORDERS: AN ALTERNATIVE TO PRIMARY BLADDER CLOSURE**
K A MTETA, J S MBWAMBO, J L ESHELEMAN, M M ABOUD AND W OYIEKO MOSHI, TANZANIA

**Objective**
To evaluate the results of children who underwent continent urinary diversion for various non-malignant conditions.

**Patients and methods**
Fifteen children, 10 females and 5 males, who underwent continent urinary diversion between 1985 and 1997 were reviewed. Eight (53%) had the exstrophy epispadias complex, four (27%) had incontinent epispadias, two (13%) had neurogenic conditions and one had traumatic destruction of bladder neck and urethra. Seven (47%) underwent Mainz pouch II, six (40%) had classical ureterosigmoidostomy and two (13%) had appendicovesicostomy. Ages at diversion ranged from one month to 13 years (average 5.4 years). Mean duration of follow-up was 3.2 years.

**Results**
Three patients developed mild unilateral non-progressive hydronephrosis not requiring surgical intervention. One patient, with a solitary kidney, developed ureteral stenosis at the implantation site and the diversion was taken down. Metabolic acidosis was well compensated with none of the patients requiring sodium bicarbonate supplements. Only one patient had night time soiling requiring the wearing of diapers.

**Conclusion**
Our experience with continent urinary diversion in children has been most favourable and offers a viable alternative method for children with bladder exstrophy epispadia complex.

**MALAWI'S ORTHOPAEDIC CLINICAL OFFICER SCHEME TEN YEARS ON - WHO SHOULD LOOK AFTER ORTHOPAEDIC PROBLEMS IN A DEVELOPING COUNTRY?**
C B D LAVY AND H LONGWE, BLANTYRE, MALAWI

Providing acute trauma care for 11 million people is difficult when there is only one orthopaedic surgeon in the country. For this reason the Orthopaedic Clinical Officer (OCO) scheme was set up in 1986. Since then 51 medical assistants have been through the 18 month training to qualify as OCOs. Of these 6 have died, 1 has retired, 4 have moved to other health care fields but the remaining 40 continue to provide the majority of Malawi orthopaedic treatment.

This paper reviews the work these officers are doing and discusses the problems they face. Now that Malawi has a Medical School and will soon be producing around 20 doctors per year, this paper also considers the advantages and difficulties involving doctors in orthopaedic and trauma care.