

The tenth Rahima Dawood Memorial Lecture

The management of neglected trauma

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The President of the Association of Surgeons of East Africa, Mr Bonnie Mauchaza, Trustees of the Rahima Dawood Foundation and Representatives of the Royal College of Surgeons of Edinburgh, Honoured Guests, Colleagues and friends.

First, I want to thank you for making me the Rahima Dawood Travelling Fellow for 1997. The tour offered a unique opportunity to learn, to teach and to discuss the many problems faced by Orthopaedic Surgeons in our region. I visited Harare, Bulawayo, Nairobi, Eldoret, Kampala, Mbarara and Maputo. I gave 17 lectures, attended 9 ward rounds and took part in 4 grand rounds and conferences but, as usual, many fascinating discussions were held over the local beers, which retain their distinctive qualities despite the South African takeovers.

I sincerely thank those that hosted me, that drove me around the cities and across East Africa. Especially, I thank my friend Rosemary Hepworth for the many hours that she spent co-ordinating the whole programme. The tour gave me a fresh and hopeful view of orthopaedic surgery and medical education in our region and has, I hope, removed any vestiges of "prejudice, bigotry and narrow mindedness" (Mark Twain, *Innocents Abroad*) that I may still have harboured after 30 years of practice in Africa.

Introduction

I chose the subject, *The Management of Neglected Trauma*, for the lecture because it is a universal problem that is seldom addressed. Textbooks are usually silent on the subject and experience accumulates slowly, largely by trial and error.

Neglect in orthopaedics is often very obvious. Our patients rarely die but may be crippled by our

inadequacies. Being an orthopaedic surgeon I will confine my remarks to the care of wounds, fractures and dislocations.

Neglect may be due to delay in presentation. The people of our rivers, swamps and lakes travel slowly and delay may be measured in days, weeks or months. Even on dry land the ambulances may travel at the pace of an ox (Fig 1).

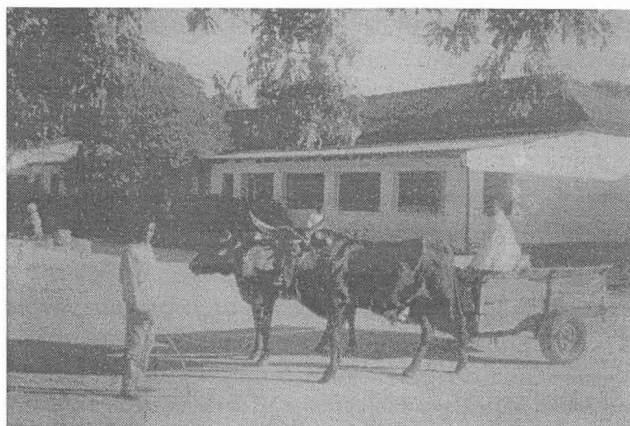


FIG 1 Ox cart "ambulance" out side Chikankhata Hospital

Further delay will occur if referral is deemed necessary. Travel to the Teaching Hospitals may be impossible for our patients. Neglect occurs if no effective alternative treatment is offered. With a little more knowledge of appropriate techniques far more patients could be treated in the peripheral hospitals.

In most, if not in all of our hospitals, a further stage of neglect occurs. Patients lie for days, weeks or even months waiting to be operated upon in theatres that have no staff, no autoclave, no oxygen, no lift

and no implants. Many fractures are said to need internal fixation but they are allowed to mal-unite and joints to stiffen while they await surgery. A stiff joint is a common sign of neglect. The pity is that there is usually a very successful non-operative treatment option that could be employed.

Restoration of complete function obtained in the safest and simplest manner (Watson Jones) should still be our goal. The misplaced emphasis on osteosynthesis often overshadows the need for joint mobility to retain function.

Wounds

Two days delay will mean that wounds are septic, tissues are swollen and poorly perfused and there is local hypoxia. Compartment pressures will be high and wide fasciotomy may be necessary to prevent muscle death. It never ceases to surprise me how much tissue expansion occurs after fasciotomy but if circulation is restored, healing is rapid.

At two days, a multiple injured person will have lungs loaded with fat and may be very anaemic. Resuscitation must be done before wounds are debrided, elevated and rested.

By two weeks the process of healing and repair is under way and any residual sepsis will have been isolated from the rest of the body. John Church, our own "Lord of the Flies" tells us that green bottle larvae can do a better job of debridement than the surgeon but I have yet to see his methods employed in our region.

By two months fibrosis and stiffness are well established.

Open fractures

Open fractures are rather special wounds in which tissue instability encourages sepsis. Stabilisation by applying an external fixator has far more influence on sepsis than all the antibiotics that may be administered. We have seen the launch this week of the *Disposafix* external fixator which is inexpensive and versatile. Most simple external fixators are useful only for fairly straight forward fractures. Severe fractures often dictate the position of the pins and the frame has to be versatile enough to stabilise the pins in their irregular patterns. Once the pins have been placed in an optimum position it is fairly easy to improvise an external fixator using

metal bars or even Kuntcher nails which may be bound to the pins with small strips of plaster of Paris (Fig 2). The fixation obtained is rigid and far more durable than might be expected. The one big disadvantage of such improvised frames is that it is not easily adjustable and the plaster bindings are quite difficult to remove.



FIG 2 *Improvised external fixator*

Sometimes it is forgotten that once an external fixator has been applied, the surrounding joints should be mobilised. This is especially true of the ankle joint where often the foot is allowed to adopt an equinus position. Muscle movement greatly aids fracture healing and it is very easy to make a sling under the foot held to a tibial external fixator with elastic straps, cut from bicycle inner tube (Fig 3), so that the patient can actively plantar flex against resistance, while the foot is passively returned to slight dorsiflexion by the elastic recoil of the sling. Allowing a stiff knee or ankle to develop is a further form of neglect.

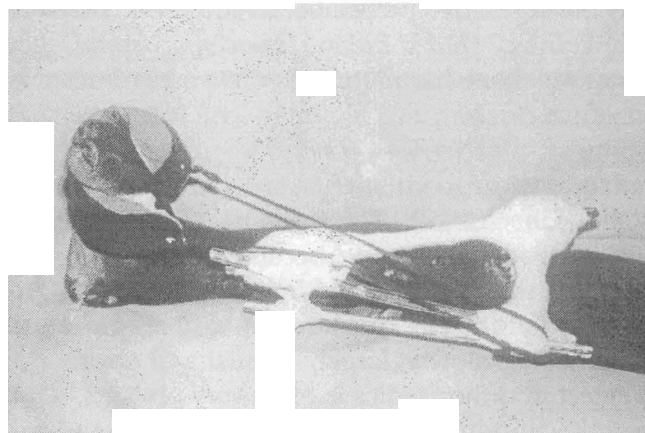


FIG 3 *External fixator with elastic foot support*

Non-operative fracture treatment

One reason for frequent referrals and delay in definitive treatment is our failure to teach and to learn the techniques of fracture manipulation and cast immobilisation. I visited a hospital in England just before this tour and the lack of knowledge and skill in non-operative management of fractures amongst orthopaedic trainees was very obvious. Great emphasis was placed on internal fixation but in some cases systems such as locking intramedullary nails were being used to hold fractures in impossibly porous bones. Some fixations had failed almost immediately and infection was not uncommon. Some of these fractures would have healed quickly and cleanly in Perkins' traction.

Sarmiento pointed out that the length of a fractured limb is dictated by the severity of soft tissue injury and is unlikely to shorten further from the position at presentation. In delayed reduction, restoration of length may further damage and tighten the soft tissues resulting in more loss of function than leg length inequality would give. The acceptance of some shortening during reconstruction and restoration of full movement is often a better goal.

The importance of joint movement in fracture treatment

Particularly in comminuted fractures near joints, early movement in traction will often preserve a very good range of joint mobility. Once healing has occurred and a mobile joint has been preserved, an occasional discrepancy in alignment can be corrected by osteotomy. Although involvement of a joint is a commonly offered indication for internal fixation of a fracture, too many early fixations result in stiff joints. More emphasis should be placed on joint movement than on the bone itself.

A word of caution here however, Perkins' traction is not an option in a patient with delayed union of the femur and a stiff knee from straight traction. If the knee has already stiffened most of the movement from Perkins exercises will occur at the fracture site and may encourage pseudoarthrosis. In this situation, firm fixation of the fracture is needed so that the knee, stiffened by quadriceps tethering can be mobilised.

Having restored joint movement in a limb, one can consider at leisure whether a raised shoe or leg lengthening surgery are more appropriate. They both have their place, but we must remember the economics of the situation for both the patient and the health service. The ability to perform a

complicated surgical task should not be taken as an indication to employ it in any particular patient.

Spinal injuries

Spinal injuries are often the subject of neglect and delayed treatment. Patients often arrive at tertiary hospitals after travelling long distances referred from peripheral hospitals because of "inadequate facilities". Two days can be considered a fresh injury, at two weeks healing is underway and at two months late complications will have to be dealt with.

We are taught to differentiate stable from unstable fractures and that unstable injuries are dangerous. The stability of the spine is of a column of blocks joined together by ligaments and supported by guy ropes that are the neck muscles, rib cage and abdominal wall. When the column fails, the blocks come to lie in new positions of relative stability. Neurological damage may be caused by manipulation or movement during lifting and transportation but is not likely to occur in a conscious patient lying in bed or being carefully turned.

Neurological damage in spinal injuries

Next we should remember that the neurological damage occurs at the time of injury and is proportional to the force applied to the spinal cord at that time. Neurological deficits do not correlate with the displacement of bone fragments seen on radiographs. Such films only show the resting positions of the fragments after the elastic recoil from a much more severe displacement at the time of injury.

Conservative treatment of spinal injuries has given very good results. Surgery may even increase the neurological damage if a fracture is repositioned when cord oedema is present. Finally, the fact that neurological improvement has occurred after surgery does not necessarily mean that the improvement was in any way due to the surgery. It follows that, in most spinal injuries, open reduction and spinal fusion would be used to relieve pain by stabilising fractures rather than to give any expectation of neurological benefit.

The role of surgery

In the cervical spine there have been instances of quadriplegia following open reduction and fusion due to displacement of disc material into the cervical canal. It is now considered mandatory to have an MRI scan to locate large disc fragments which can only be removed by an anterior approach. Where

this is not possible it is wise, in fresh cases, to gain reduction slowly by traction, positioning or minimal manipulation. In neglected cases, at two weeks or two months, fusion in situ rather than an attempt at complete open reduction is far less dangerous and achieves the same goal.

Where there has been bony damage, some patients will spontaneously fuse by two months and will need no further treatment.

There are only very rare indications for operating on thoracic injuries but lumbar injury should be reduced and fused however late the patient is seen because of the weight bearing role of the lumbar spine. Thoraco-lumbar injuries should be fused if they are very painful or widely displaced. In general attention to the urinary tract and the healing of pressure sores and general rehabilitation will be the major preoccupation in neglected spinal trauma.

Dislocations

Neglected, unreduced dislocations of major joints are common occurrences. Whether a particular joint can still be reduced by manipulation will depend upon the anatomy of the joint, the elapsed time since dislocation and the amount of retraction and fibrosis that has occurred.

Acromio-clavicular and sterno-clavicular dislocations

Neglected acromio-clavicular and sterno-clavicular joint dislocations should be left unreduced. The patient should be encouraged to accept the deformity and reassured that function will not be affected. If pain persists the appropriate end of the clavicle could be excised but this is very rarely necessary and may leave an ugly scar.

Dislocations of the shoulder

Neglected shoulder dislocations can usually be reduced by the Hippocratic technique at up to two weeks from the time of dislocation. A long steady pull to gradually stretch the tissues will succeed better, and with less risk of fracture or neural damage, than a violent manipulation. By two months retraction and fibrosis of the anterior muscles has occurred. These must be released to allow open reduction and repair. The reduction is often unstable and temporary fixation of the joint with a transfixing Steinman pin may be required.

Posterior dislocations, though uncommon, almost

always present late because the injury is at first unrecognised. Open reduction is usually required supplemented by a bone block to the posterior wall of the glenoid to give stability.

Elbow dislocations

Unreduced dislocations of the elbow are common. In children this is usually because manipulative reduction has been blocked by the avulsed flexor origin. The medial epicondyle has been drawn into the joint. Open reduction is usually easy once the epicondyle has been pulled from the joint. It may be sutured back in to place or fixed with a temporary Kirchner wire but damage to the ulna nerve must be avoided.

In adults, posterior dislocation of the elbow can usually be reduced by manipulation for up to three weeks after injury as long as no fractures accompany the dislocation. The technique is to employ successive teams of helpers to stretch the triceps and other tissues by longitudinal traction for one minute for each day that has elapsed since the dislocation occurred. Only then should the doctor attempt to reduce the dislocation in the normal way.

Open reduction by a posterior approach with a Z lengthening of the triceps tendon should only be employed in children or in young adults in whom the tissues are still fairly mobile and no callus is apparent on good quality radiographs. Not uncommonly, a painful stiff joint results from this operation, so patients should be selected with care. The alternative procedures are excisional arthroplasty and arthrodesis.

Excisional arthroplasty (Fig 4) is a very good operation to retain arm function in young adults as long as it is possible for them to attend physiotherapy for a prolonged period. Mobility, stability and function all depend entirely upon muscle power. At operation it is important to remove sufficient bone, including the head of the radius and the olecranon notch of the ulna and the humeral condyles and to draw as much soft tissue as possible together between the bone ends.

After surgery, we elevate the arm in running forearm traction with just enough weight to support the arm and exercise from the first postoperative day. After a week or ten days the weight is halved allowing biceps to be exercised in hand to mouth flexion. A good result will allow 5kg to be carried in all

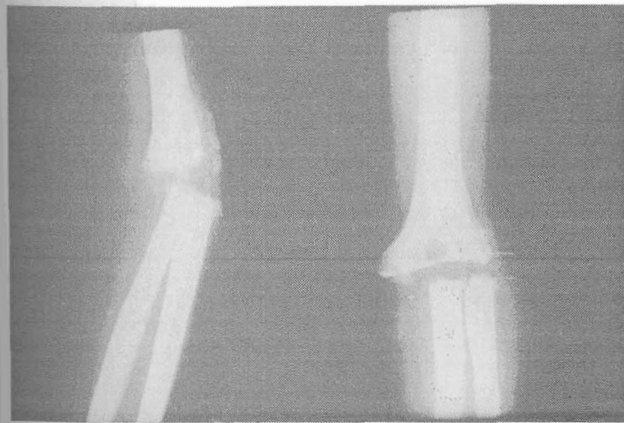
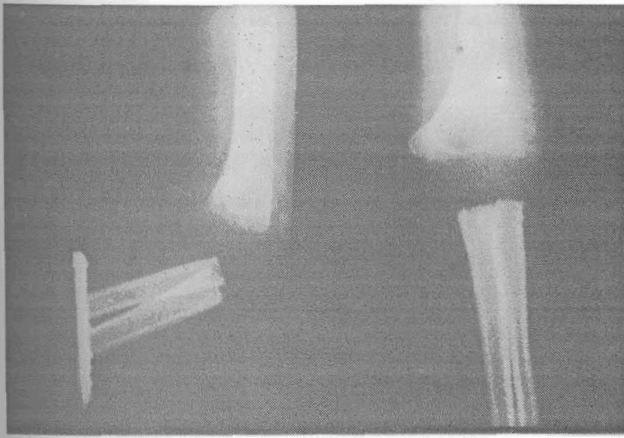
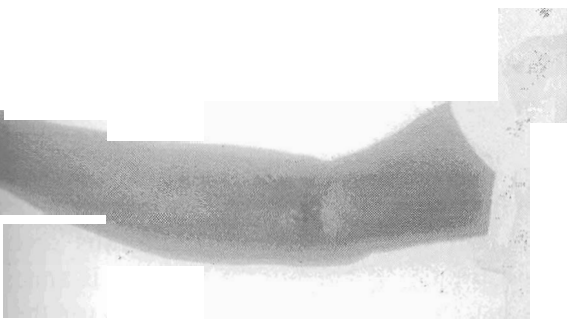


FIG 4 a & b Radiographs after excisional arthroplasty of the elbow a, one month and b, six months after surgery.



FIGS 5 a & b Range of movement after excisional arthroplasty of a stiff elbow.

positions of the "joint" but a lot of hard work by the patient is required to achieve this (Fig 5).

In the elderly, the feckless and those for whom physiotherapy is not possible we recommend arthrodesis at 80° flexion fixed with a strong plate from ulna to humerus.

Monteggia fracture dislocation

For neglected Monteggia fracture dislocations at two weeks, the ulna fracture will need open reduction and internal fixation to restore length and alignment, so allowing open reduction of the radial head with repair or reconstruction of the annular ligament. After two months the ulna may need to be shortened before fixation and the head of the radius excised. This will still produce a good functional elbow.

Dislocations of the hip

Neglected dislocations of the hip are often a very difficult problem to manage. Manipulation under deep relaxed anaesthesia may be successful within the first two weeks of injury. Sciatic nerve damage is probable if violent manipulation is employed and again it is better to attempt slow stretching of the tissues by relays of helpers before actual reduction is attempted. If concentric reduction cannot be achieved, open reduction should be employed.

I prefer to operate through a posterior approach with the sciatic nerve fully exposed and protected. Thorough inspection of the acetabulum is important to ensure that no soft tissue or bone fragments obstruct full reduction. Unless the acetabular rim has been fractured the joint is usually stable, but skeletal traction in abduction should be employed for four weeks. The incidence of avascular necrosis of the femoral head increases in proportion to the time that is allowed to elapse before reduction. This rises from 10% for reduction on the first day to over 50% if open reduction has to be employed or considerable delay has occurred.

Beyond two weeks, open reduction becomes increasingly difficult. Some surgeons employ heavy skeletal traction prior to open reduction attempting to draw the femoral head down to the level of the acetabulum but I found that there is a high incidence of sciatic palsy and that it is still very difficult to achieve open reduction. I believe that most of the difficulty lies in the retraction of the hip adductors and flexors by that time. I prefer to release the adductor tendons and cut the iliopsoas in the groin

before turning the patient on his side and approaching the hip from the posterior aspect with thorough mobilisation of the sciatic nerve. If a very long delay has occurred (Fig 6) a Girdlestone excisional arthroplasty with a subtrochanteric abduction osteotomy may be an easier and better option.

Femoral neck fractures

Another common problem in our region is the neglected femoral neck fracture in the elderly. Presentation at the first hospital is often delayed

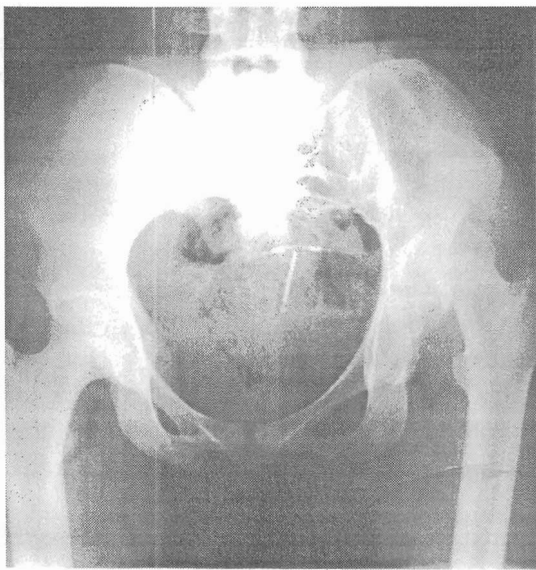


FIG 6 Radiograph of a painful hip two years after posterior dislocation. A Girdlestone excisional arthroplasty was performed

and then the patient is usually referred to a tertiary hospital for treatment. Some patients will be walking on their established non-union using crutches or a walking stick by this stage and continued mobility should be encouraged. Others will have too much pain, probably from avascular necrosis of the femoral head and will demand surgical treatment. For these, hemiarthroplasty or total hip replacement is the best option if they are fit for surgery and likely to remain mobile. There are rather few hospitals in our region however, where such operations and prostheses are easily available or affordable. I think that the best alternative is to supply the patient with a walking frame, made by the hospital carpenter. If pain remains severe however, excision of the head and remainder of the femoral neck may be performed

but these elderly people are rarely able to walk well with a Girdlestone arthroplasty.

Ankle fractures

Conservative treatment of ankle fractures has a bad reputation because of poor results. There are two basic reasons for this, first neglect in the teaching of the skills of reduction and secondly, neglect after initial reduction and plaster casting.

The late Sir John Charnley, in his book, *The closed treatment of common fractures*, has beautifully described how to reduce a Pott's fracture. First one must realise that despite all the various fracture and ligament injuries you are basically dealing with two fragments. Then let gravity assist you by hanging the leg over the end of the operating table. Feel how the fragments reduce and fit from front to back and from side to side and avoid twisting the talus that will spread the ankle mortice. Then reduce the fracture, apply a padded plaster and hold the reduction with three point fixation. Finally elevate the leg to reduce swelling and encourage toe movement.

Now comes the usual period of neglect. The patient is often sent home at the point when swelling is subsiding and when seen after a couple of weeks, the cast no longer fits and not surprisingly the fracture has slipped and is now stuck in an unacceptable position.

The essential step in treating a Pott's fracture is that the initial cast must be removed as soon as swelling has lessened (usually at one week) and the fracture remanipulated and a new cast applied with minimal padding. The only areas then needing padding are the malleoli and along the subcutaneous border of the tibia.

I thought it pertinent to point out where and when the neglect of this fracture usually occurs. However, the brief of this paper is to discuss what to do about it. At two weeks, open reduction should still be possible with emphasis being placed on restoration of the length of the fibula and repositioning of the talus in the ankle mortice. Beyond this point both open reduction and successful fixation become more and more difficult. By two months successful reconstruction for a functional result is impossible. The patient should be encouraged to use the ankle before any further thought of reconstruction or, more probably, arthrodesis are entertained. I think that it

is a mistake to attempt arthrodesis unless the patient has been bearing weight for some time and therefore do not do the operation within six months of the injury.

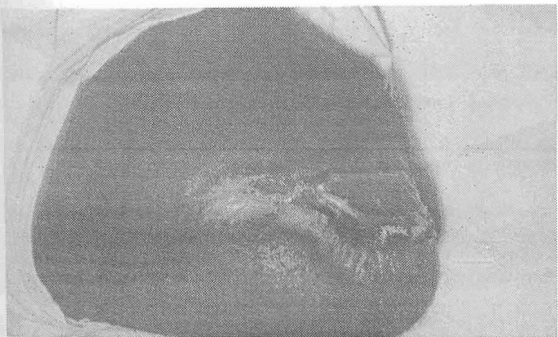
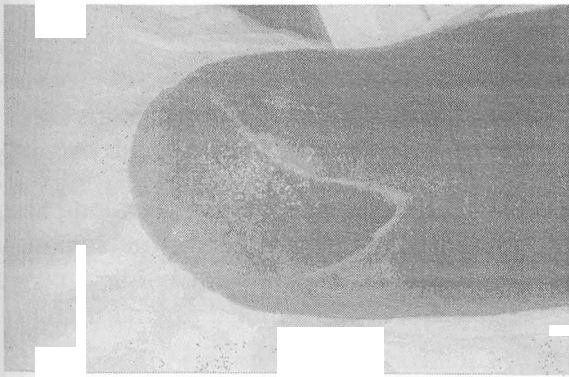
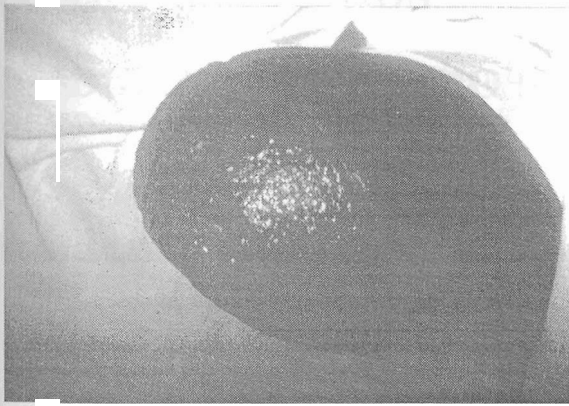
Amputations

Lastly, a word about amputations. Amputations are often performed because the limb is a danger to the patient, as may happen in an infected open fracture. Such open amputations should be left with as much bone length as possible so that a future myoplastic amputation can be performed allowing good use of a prosthesis. As the stump cleans and granulates, it is tempting to put a split skin graft on to it but for the sake of future function it is better not to do so. In this instance, the contraction of scar tissue can be a friend. It draws the skin together over the stump as shown in figure 7, eventually ending up with good skin and a small terminal scar. That scar and the underlying bone can easily be resected at some future date giving excellent coverage of the stump.

Conclusion

The best treatment of neglected trauma is prevention. Some problems we can do nothing about but we could considerably reduce the workload by promulgating the early effective treatment of injuries as described in the book, *Primary Surgery: Volume II Trauma*, written by members of this Association under the editorship of Maurice King.

Mr Chairman, ladies and gentleman, I have attempted to suggest methods of treatment for some of the common injuries that we may see as delayed or neglected presentations. All of these topics were brought up in discussion during my three weeks of Rahima Dawood Travelling Fellowship so that I am sure that they are of concern to the trauma surgeons of our region. I do not pretend to know all the answers but I have offered something of my experience.



FIGS 7 a, b, c & d Secondary healing of an open amputation showing good skin being drawn over the stump by the contraction of scar tissue by three months.