

BEDKNOBS AND BROOMSTICKS

The need to revisit older techniques of fracture management

Trends in orthopaedics

Orthopaedic surgery has made enormous advances in the last 75 years. Or has it?

The early development of internal fixation techniques by Arbuthnot Lane and by Sherman has progressed to the point where we now worship the Holy Trinity of *Accurate Anatomical Reduction, Rigid Fixation and Compression*, and bow down to the altar of the *Almighty AO*. Interesting choice of initials that, isn't it? A and O. Alpha and Omega. The Beginning and the End.

The aim of the new breed of orthopaedic surgeons is to create a fixation technique for every fracture; sometimes it seems that any fracture that cannot be fixed operatively is seen as a failure of the current techniques and a challenge to the implant manufacturer.

Let's not be too hard on these people. There are certainly other reasons for this trend:

- The trend in fracture management has been towards management of fractures in highly specialised units by skilled surgeons who also train other doctors in surgery. It's not to be wondered at if they want to operate; surgeons like to operate.
- Internal fixation *as an alternative to prolonged hospital admission* saves time in hospital and reduces hospital costs. It improves turnover and efficiency in a specialised unit where there are many skilled doctors and the need is to bring in more patients for them to treat.
- The skilled doctor input in internal fixation is concentrated on the theatre procedure where the skilled doctors are to be found and is much less necessary in the recovery period. There the need is more for physiotherapy, which is often freely available in such hospitals.
- The need of doctors in training is often perceived as being the need to learn operative skills. After all, if one trains in orthopaedic surgery one wishes to learn surgery.
- Certain fractures are unequivocally better treated by operation.

The AO was developed in Switzerland where many fractures had to be treated in young, healthy skiers. Where these fractures were compound they were protected from contamination by clothes or at worst contaminated by fresh, clean snow — all a far cry from the tibial shaft plugged full of river sand that confronts us all too often! Furthermore their patients were on holiday and wanted to get home quickly rather than be stuck in hospital in a foreign land. Nor did they want to go home in an ambulance and with that their insurance companies agreed wholeheartedly! And of course highly skilled surgeons were readily available.

Out of all this has come a system of fixation that is undoubtedly an advance and of great value. Let us not deny it.

Of course one must also not forget that in private practice an operation done is a fee earned and we all know that if it's right for a private patient then it must be aspired to for a state patient.

Perhaps it is interesting that those fractures which have continued to be looked after extensively by generalists have not received the attention from the fixationists that have fractures which are often admitted to hospital. Colles fractures, humerus fractures, clavicle fractures and rib fractures have spawned few advocates of fixation. It could be said that this is because there is no need, but it could also be said that this is because there is no opportunity. Opportunity, that is, for the surgeon.

Furthermore, fractures where there are no adequate or satisfactory methods of fixation are often treated non-operatively, even by the interventionists. Badly comminuted fractures of the ankle or knee, bad fractures of the pelvis, in fact many really severe fractures, are not considered fertile ground for the surgeon, either because of technical difficulties or unsatisfactory results. It is also notable that many very severe compound or comminuted frac-

tures, particularly those involving joints, are often treated by closed methods and indeed are very difficult to operate on. Is this a failure of the operative school, to be addressed by yet more complicated methods of fixation? Or is it rather that closed management is actually better?

The argument for non-operative treatment

So what of those fractures which can be treated satisfactorily either operatively or non-operatively? The tibial fracture is perhaps one of the commonest of these. The argument against long hospital bed occupancy is invalid as most patients can be sent home in plaster. The results of non-operative management are generally good and the complications of surgery not inconsiderable. The management of non-union following closed treatment is simple and effective (by Phemister bone graft), while that of non-union after open treatment is fraught with difficulty. Yet what is the trend here? The development of intra-medullary and interlocking tibial nails has brought with it a move towards fixing tibial fractures. Or is it, of course, the other way round?

Of course there *is* no "school" of non-operative treatment to develop the skills and techniques of the method. How can there be a "school" when the practitioners are so remote from the centres of influence? How can it be reasonable to insist that a teaching hospital uses and teaches non-operative management, when it would have all its beds full of patients in traction in no time at all and have to close down?

But in a rural hospital a ward will have a wide variety of different patients with different pathologies. The man with cardiomyopathy and the man with diabetes will rub shoulders with the man with a fractured femur. It is no trouble to have two traction frames in use for a few weeks at one end of the ward and causes little disruption to ward routine.

Furthermore, with only a little understanding of the principles involved and with a little care, these patients may well have a final result every bit as good as their counterparts treated by surgery.

This is important: *Non-operative care is not inferior care*. It is simply care adapted to the circumstances in which it is given. In many circumstances non-operative care is decidedly better than operative care, particularly in that it reduces devascularisation of fracture fragments and thus does not interfere with the healing process.

That which is appropriate in a first world environment with wall-to-wall doctors and high costs of hospital stay is not appropriate in a rural African environment where the resources available are quite different. Rural doctors are generalists and are usually seeking to reduce their operating commitment, even at the expense of longer hospital stays. Their skills are great, but not specifically surgical. Their patients are often malnourished or immune-deficient and their capacity for dealing with complications is limited. Their resources are good nursing staff and such facilities as food and linen which can easily be provided locally; they may not stretch to the purchase of expensive implants. A hospital stay in a rural hospital can sometimes be relatively cheap and is certainly easy to arrange within the local resources.

The deficiency of training

The problem of course is that those doctors who work in the rural hospitals were not trained to work there. They were trained in large city hospitals with plenty of facilities and lots of trained or training surgeons. And they were largely trained in the operative philosophy of fracture management, even if they never learned to do the operations themselves. The same is true of those excellent orthopaedic nurses we have in our rural hospitals. They are invaluable. But when I have asked them to put a patient up in traction I have sometimes been faced with a blank stare, followed perhaps by much leafing through very old and dusty textbooks from the library.

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Worst of all, if those doctors and nurses are not familiar with the non-operative techniques of fracture management then they will feel lost and helpless in situations where they could be perfectly capable of coping.

I believe that there is a need to ask ourselves about the medical skills available to most of our patients. The move towards more operative management of fractures is often also a move towards more centralised management of fractures. Is this necessarily a good thing? In the 13 years I have been in Africa I have already been confronted with the virtual collapse of orthopaedic referral services for a prolonged period and at present it is still often impossible to get simple hip fractures fixed in KwaZulu-Natal.

Surely even on practical grounds we need to develop the school of non-operative management. For non-operative management (I prefer to call it "non-operative" rather than "conservative") can be practised in rural environments with limited skills, given only some understanding of the principles involved. And the principles can be taught fairly easily.

My training programme

For ten years now I have been actively involved in teaching rural doctors, who often have no background of trauma, to deal with the majority of bone trauma that presents to them. I have found that it is possible by teaching a few basic principles and providing support to make quite junior medical officers into doctors competent in managing even quite complicated trauma.

Some of the principles which need attention are:

- What is acceptable? Anatomical perfection is not the aim. Function is almost everything, with some attention also paid to cosmetic result. What deformities can be accepted and what must be avoided? A feel needs to be developed for what is important.
- Pay attention to leg length.
- How can the acceptable be achieved with the minimum fuss to the patient and with the maximum reliability? We do not want long hospital stays if they can be avoided, neither do we want a child carried through a river in flood on his grandmother's back for a "plaster check", as happened to me once.
- What are the basic principles involved in the above and how can we use what we have available to comply with them? Equipment may not be there, but it is amazing what good results can sometimes be achieved by improvisation.
- Pay attention to plaster technique, especially to moulding of the cast. Few of us have been taught to apply a plaster properly and this can make a massive difference. Teach also the technique of wedging plasters.

Pay attention to the principles of reducing fractures, particularly to understanding the forces that caused the fracture and the need to reverse them, and to the role of the surrounding soft tissues. This is very useful information for people with no training in orthopaedics and is often ignored.

Some examples are demonstrated:

Where traction frames and Thomas splints are not available you can draw a diagram of the forces you want to bring to play on a limb and invite ideas as to how they might be derived. I've had wooden blocks, pads and all sorts of things produced as a result of that challenge, often displaying enormous ingenuity!

If there is a lot of skin loss then an external fixator can be made using some polymethyl-methacrylate ("Acrylic") begged from the dentist, who knows it as "dental repair cement".

Where access to the skin is not important some pins driven through the bones and incorporated into the plaster cast will achieve fixation satisfactory for bearing weight, and this may make it possible to mobilise an old lady who would otherwise waste away in bed.

A Steinman's pin through the proximal tibia can be incorporated into the proximal end of a below-knee plaster cast to prevent rota-

tion of even a proximal tibial fracture, thereby allowing full use of the knee.

Proximal and distal pins through the tibia and incorporated into a plaster cast can be used to hold a comminuted fracture out to length every bit as effectively as a hi-tec fixator or an interlocking nail. This technique can even be used to stabilise tibial plateau fractures.

Hip spica plasters will enable you to get your children with fractures of the femur home in less than two weeks.

Supracondylar fractures of the distal humerus are common fractures in children and are difficult for the inexperienced manipulator to reduce. The fact is that in children reduction is totally unimportant. Provided that the carrying angle is not in varus or valgus and that medial and lateral displacement is not more than about a centimetre it is perfectly satisfactory to provide gentle traction by application of a plaster cast to the forearm as a weight and sending the child home. You will have to explain to the parents why the plaster is not over the fracture though!

The way forward

So how are we to establish a "school" for non-operative treatment of fractures? And how are we to ensure that the techniques can be learned and developed by doctors and nurses in the future?

I believe our first priority is to establish rural medicine as a discipline in its own right. Once the discipline is established it will become respectable to discuss management of patients in our environment, whether it be our techniques of fracture management or of general anaesthesia. At present we are judged by the criteria of the specialist and these should not be *our* criteria. We must build up a body of opinion in our own "specialty" which can provide the norms and standards by which we work in the same way as is the case with all urban doctors.

Only from the universities can come the requirements for training and qualification.

Perhaps the best and quickest way to become involved with the universities is to join the ranks of the family practitioners, who are already part of the establishment. If they will have us, we can extend the scope of their specialty to include ourselves. If they will not have us then we shall have to forge our own way separately, but one way or another we must obtain a presence in the medical schools.

Then we must win the battle for the minds of our young doctors. At present they suffer from ignorance, tinged with fear and reinforced constantly by a culture within the medical schools of decrying rural medicine. We must dispel that fear by removing the ignorance. To do this we must expose our medical students and doctors to rural medicine. In other words we must get involved in teaching and training.

Experienced rural doctors will have to be recognised as trainers by the medical schools and given honorary lecturer status with access to university facilities for research. They can then become involved formally in the training of students and doctors.

This training will have to take place in the rural environment, where the forms of management that we wish to teach are being practised. Each medical student needs to be given the opportunity (compelled?) to spend between one and two months in rural practice under the supervision of a trainer as a recognised part of his course and counting towards his assessment. In addition all doctors in specialist training should be expected to spend some time in rural medicine, when they would be expected to learn more about their place in the service and would promote understanding and transfer knowledge between the centre and the periphery.

A few years ago much of this would have been unthinkable in the corridors of power in South Africa. But attitudes are changing. There is an opportunity now for us to have our views heard and it should not be missed.

The first step has been taken with this World Rural Health Congress. Let us move on from here!

Conclusion

I would finish with some quotations:

John Charnley, the man who made the total hip replacement

into a routine operation and who can therefore hardly be said to be shy of surgery, wrote one of the best books written on the subject of non-operative treatment of fractures, *The Closed Treatment of Common Fractures*. In it he discusses the advantages and disadvantages of operative and non-operative treatment.

He quotes the following conclusions from a study of 100 successfully-united fractures of the tibia and 85 tibial non-unions made by Urist, Mazet & McLean in 1954:

"The effect of open operations on fresh fractures is to increase the volume of damaged bone which has to be absorbed and replaced before the fracture can unite and permit full weight-bearing.

"Comminuted fractures of the adult human tibia should be considered non-operable because the trauma added by surgery exceeds the normal capacity for bone regeneration in this area of the skeleton.

"In fractures with contact between the bone ends, internal fixation has either no effect or no adverse effect on the healing time. It is never a stimulus to bone repair.

"If a fracture is short and oblique rather than long and spiral, and if two or three screws are inserted in order to achieve strong fixation, there will frequently be enough necrosis of the bone around the metal to cause disintegration of the entire area of the fracture.

"The very good results in the majority of non-comminuted fractures could be used as evidence in favour of internal fixation, but the argument is weakened by comparison with the equally good results in matched fractures treated by closed methods.

"Open reduction and internal fixation of extensively comminuted fractures always prolong healing and never encourage it."

To this he adds from his own observations:

1. If both fragments are alive, rigid fixation is not essential for union.
2. If one fragment is ischaemic, rigid immobilisation is essential for union.
3. If both fragments are ischaemic, rigid immobilisation is futile.

He then goes on to say the following:

"The harmful effects of conservative treatment of fractures of the shafts of long bones are all related to residual deformity and stiffness of joints ...

"... it is interesting to consider the three following propositions:

- Operative treatment is potentially harmful to all fractures, but conservative treatment is harmful only to a few.
- Few fractures which are harmed by conservative treatment would have been less harmed had they been operated.
- Failures of operative and of conservative methods are not equally capable of being salvaged by secondary procedures ...

"... Reviewing fractures of the shafts of the long bones ... I have come to the conclusion that only in two sites are the failures of conservative treatment worse than the failures of operative treatment, namely:

- (i) middle and upper thirds of the femur (*not* the lower third)
- (ii) shafts of the radius and ulna ..."

And, later, on joint stiffness:

"I am tempted to suggest that these facts conceal a relation which might almost be elevated to the dignity of a natural law (the "Law of Closed Treatment"), i.e., that *after fracture of the shaft of a long bone, the associated joints will tolerate fixation for the duration of normal union without either permanent or significant loss of motion.*"

In 1932 Gaythorne Girdlestone wrote:

"A bone is a plant with its roots in the soft tissues and when its vascular connections are damaged it requires not the artifice of the cabinet-maker but the care and attention of the gardener."

I believe that these words should still be pondered by young doctors before they embark upon the operative management of fractures. We should remain true to the principle of *Primum non Nocere* — first, do no harm. Only if there are demonstrable benefits from an operation should we subject our patient to it.

I also believe that if we conscientiously develop the techniques of non-operative management and train our young doctors in them we shall be enabling our rural hospitals to offer a much-needed service to their patients where none existed before. ●

VACUUM EXTRACTORS

Using them appropriately in rural practice

I. Simple steps to help with delay in second stage and to aid vacuum deliveries

Birth should occur mainly by uterine contraction and maternal expulsive efforts, complemented by traction with the VE

- A. Urge to bear down, fully dilated and head well down.
- B. Position of mother — hyperflexion and abduction of the hips.
 1. Lithotomy with back propped up to 60° or
 2. Squatting position — fall onto hands and knees slightly as the baby is delivering — natural VE.
- C. Oxytocin — use varies with parity.
 1. Primip — contractions not strong, moderate moulding, no foetal distress — trial of Oxytocin; expect delivery within 30 minutes after starting Oxytocin.
 2. Multip — uterus should contract adequately, delay more likely due to obstruction — safer to do an instrumental delivery if head is low enough.

II. Assessment of a mother with a prolonged second stage

The decision whether or not to do a vacuum is more important than actually doing the vacuum

- A. History
 1. Parity — high parity more likely mechanical than in primip.
 2. Risk factors — previous stillbirth more likely to have problems with VE.
 3. Progress in the first stage — delay in first stage, particularly late in the first stage, is more likely to have difficult second stage and CPD.
 4. Duration second stage — prolonged pushing already unlikely to get healthy baby vaginally.
- B. Examination
 1. General — assess the mother's ability to co-operate, pulse, temperature, hydration, septic.
 2. Abdominal —
 - a. Contractions — assess strength;
 - b. Signs of CPD —
 - i) size of baby — HOF > 36cm at full dilation suggests big baby;
 - ii) level of head in fifths, overlap, not engaged and moulding = CPD;
 - iii) late signs of CPD — Bandl's ring — an overstretched lower segment = obstruction which requires CS or symphysiotomy;
 - c. Bladder — blood-stained urine, difficulty in passing a catheter, suggests major degree of CPD;
 - d. Foetal condition — late decelerations, bradycardia between contractions requires gentlest delivery possible.
 3. Pelvic examination
 - a. Cervix — fully dilated?
 - b. Caput & moulding assessed together with the level of the head, large caput (subaponeurotic haematoma) is contraindication to VE.
 - c. Position of head — position of posterior fontanelle.

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