

a new look at amputations and amputees.

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This is a talk given by Mr. Parnis at the Medical School Conference Hall on the 24th January, 1975. Mr. Parnis was the first local holder of the BMA-RUM Travelling Scholarship.

Malta is a country where one talks of impressions, where rumours abound and where facts, pure facts are quite hard to come by. There are several reasons for this state of affairs: if we limit ourselves to medical matters the main ones are a lack of a proper records system and the difficulty of looking up figures and suchlike on account of one's many other commitments. Trollpe says somewhere or other that happiness consists of having twelve hours work to do and only six hours to do it in. We are in this sense extremely happy: in fact we are laughing, but research is not carried out under these conditions.

Since my return to Malta three years ago I gradually formed the impression that amputees are not receiving the attention due to them. Amputations, I am now referring specifically to lower limb ones, are done by general and orthopaedic surgeons and their registrars and after their operation the patients vanish, to a grave, to another hospital, to a courageous wife or husband or occasionally to our one and only limb fitter whose advice we never seek and whose results we never question. I therefore thought it would be a good thing if I were to spend a while in a first class unit dealing with amputees, see what could be learnt and try and carry away the good news back home to be put, I hope, to equally good use. I was therefore very happy and most honoured to have been chosen as the first BMA-RUM Travelling Fellow of local origin.

The destination of the journey was Roehampton where I spent three weeks at the limb-fitting centre seeing and doing what I chose, with the fullest co-operation of the whole staff. The hospital nearby, Queen Mary's Hospital, is a general hospital in the Westminster Group and it was an old friend, Professor Ellis, who arranged things so well for me. The limb-fitting centre at Roehampton is not, however, a part of the hospital service but comes directly under the Ministry of Health. There are historical and developmental reasons for this divorce, which is not considered a good thing and which will in the foreseeable future be changed, following the recommendations of the Committee on Prosthetic and Orthotic Services of the British Orthopaedic Association.

There are 25 limb fitting centres in England and Wales catering for some 70,000 lower limb amputees and 13,000 upper limb ones. 5,000 amputees are referred there each year, 70 per cent of whom are over 65 years old. Roehampton is by far the largest as it serves the whole of London and the Home Counties. At the centre there are seven limb-fitting surgeons and it was with four of them, headed by Dr. Vitali, that I sat most of the time I spent there. In England the

place of the medical man in limb-fitting, as distinct from the limb-fitter or prosthetist, receives rightly or wrongly more emphasis than probably in any other country. The limb-fitting surgeons work a nine-to-five 5 day week and during the day see about 15 patients. There is thus ample time to listen to what the patient has to say about his artificial limb, to arrange for minor adjustments, to order a new limb or to discuss particular problems with the limb-fitter.

These patients are patients for life and a close bond is formed between them and their surgeon so that prize winning exhibits at the local Women's Institute are brought to be admired, advice about their daughter's boyfriend is solicited and gardening exploits related. Patients are allowed two limbs each, a somewhat wasteful procedure as we shall see, but unlike most other countries no amputee goes without a limb for financial reasons. Limbs were ordered by numbers, the most frequently prescribed ones being a No. 2 for an above knee stump and a No. 8, a patellar tendon wearing one, for a below knee one. Whether a patient brought forth many complaints or not depended mainly on his or her age. A young amputee usually managed very well and had little or nothing to report. As one of the surgeons told me "if a young man has both his legs off and he breaks his prostheses he will surely find some way to go out and meet his girl". On the other hand the elderly amputee often had his troubles due to passing years and increasing respiratory insufficiency and he tended to put the blame on to his artificial limb "I cannot use the limb for long distances as I used to". Even earache was on occasion blamed on to an above knee prosthesis! The date of delivery is metalled on to the limb and it is intended to serve for five years. However, in many cases it remains useful for much longer if well cared for and the advice given to patients is this: if it is comfortable keep it.

One of the limb fitting surgeons, Dr. Fletcher, with whom I sat, deals mainly with upper limb amputees of whom he has unrivalled experience. The main reasons for these amputations are congenital and industrial and road accidents, especially brachial plexus injuries in motor cyclists. Patients become one-handed very quickly and upper limb prostheses are in the main used by people at work or for cosmetic reasons or in double amputees. A rubber hand is stiff and strong for work while a dress hand has plastic stiff fingers for carrying or foam rubber for better cosmesis. The most impressive patient I saw was a black Jamaican with bilateral tru'knee amputations and short arms over which he wore prostheses when he wanted to look good. He played the piano well and was training to be a teacher.

In the hospital ground adjacent to the Centre are the factories of Messrs. Hanger and

Company under whom our Mr. Attard trained and with whom he keeps in close albeit sometimes irritated relationship owing to the delays in despatching the limbs he asks for. There are also small workshops belonging to two other firms Vessa and Blatchford whose actual factories are some distance away; so there are three firms dealing with lower limb prosthesis of which Hanger's is by far the largest. I shall mention Blatchford again later on as they have pioneered the MAP, the modular assembly prosthesis. Steepers have the monopoly of upper limb prostheses and monopolies are not usually good things.

I spent two sessions at Hanger's visiting their factory which is large and noisy and divided into several sections, leather, plastic, wood etc. The limb fitters who are employed by the firm see a patient initially three times. On the first occasion measuring and casting with plaster of Paris takes place and the patient is asked to send the shoe that he will wear. On the second occasion there is fitting with major or minor adjustments, trimming, making the leg vertical and so on and lastly the limb is delivered and put on and it has to be approved by the limbfitting surgeon. There are two snags here. The first is the length of time the patient has to wait before the limb is delivered. At present it is rare for a patient to receive any sort of appliance of factory construction in less than three weeks and a definite limb may take two months or more. This of course is bad because the remaining life span of the majority of amputees is limited and every day lost increases the difficulty of establishing walking patterns. The other snag is that the limb is approved when the patient has used it for a very short while and is happy with it. It is really only when he goes home and uses it for several days that he can say that all is well.

The training of a limb fitter takes four years, a quarter of the time being spent at the Paddington Technical College and the rest at Hanger's in the status of an apprentice. The trainees who are usually picked from promising workers at the factory have to be presentable and to get on well with people. The course is called Certificate Prosthesist and it is run by the British Institute of Surgical Technicians. There were several Commonwealth trainees at Hanger's. A fitter usually looks after a particular patient indefinitely and a question often asked of patients by the surgeon was: 'who is your fitter?' There are similar fitting arrangements in all the provincial centres; should an amputee move from one part of the country to another his medical notes and the manufacturers prosthetic file are transferred with him so that complete continuity is maintained.

Now I would like to deal with the very important subject of physiotherapy. Treatment should be carried out in the department and not in the wards and it starts ideally a fortnight before the operation. During this time we aim to achieve maximal fitness and functional activity. I will mention some of the points which are attended to. Hip and knee contractures are guarded against and if present they are corrected by exercise and

positioning plus gentle stretching. The patient is taught how to walk with elbow crutches, how to bear weight on one leg and how to balance and walk on a prosthesis by the use of a pre-amputation limb, a kneeling pylon. Exercises are given to strengthen the grip and the muscles of the trunk and of the arms for crutch walking. Naturally we must not forget breathing exercises and showing the patient the most effective method of coughing in order to prevent post-operative complications. Deep vein thrombosis is guarded against. The immediate post operative period sees the continuation of everything we have already noted and by the third or fourth day the patient can sit in a chair and learn sitting balance and trunk stabilising exercises. Soon after he goes to the Physical Medicine Dept. wearing normal clothes and a well-fitted shoe on the sound foot and here he practises balancing and walking between parallel bars. On the twelfth day the sutures are removed and firm stump bandaging starts as soon as it, the stump, has healed. The purpose of this is not as some might think, to produce a conical stump but to reduce the oedema and to accustom the stump to the firm all-round pressure which it will experience when an artificial limb is worn. When patients are finally on their own they are given a bandaging leaflet which explains the correct technique and they are told to reapply the bandage 3 times a day until a limb is worn all day. If they have to stay in bed for a few days on account of illness later on, they are told to resume the same constant bandaging of the stump until they are up and about and wearing their artificial limb.

The patients graduate from the bars to crutch walking and functional activities are practised such as getting in and out of a bath and going to the lavatory. Ideally a pylon leg should be given to a patient within a few days of his operation but as I said delivery is not usually so quick.

When the pylon leg arrives the patient goes to the walking training school, attending daily or at least three times a week, travelling on his own or by ambulance if he lives fairly near. Otherwise he may be admitted to one of the rehabilitation wards of the nearby hospital. The walking training school at Roehampton is an impressive sight, with the newly fitted amputees moving on from parallel bars to walking frames, tetrapods and sticks. There are twenty of them in action at one time. A home visit may be needed if it appears that there are barriers to the patient's independence; the physiotherapist and the occupational therapist may make suggestions for structural alterations and the medical social worker will see that the local Authority has the work carried out.

You may wonder at this stage why I have not mentioned the immediate fitting of a prosthesis after operation. In 1965, Professor Marian Weiss of Constantia in Warsaw, whom I had the pleasure of meeting in Ghana in the same year, visited Roehampton and gave a demonstration of his method of the fitting of an immediate prosthesis to an above knee amputee. A similar

method was being employed at the same time by Dr. Burgess in Seattle. Enthusiasm was kindled and the method was used in many centres including Roehampton. It was abandoned mainly on account of common or garden sepsis but cases of gas gangrene necessitating amputation at a higher level and of tetanus also occurred. I think it is fair to say that the method is used today only in specially selected cases even in Constantia and Seattle.

In the case of the minority of amputees which are still at work there will be a number who will be unable to continue at their job and interviews are arranged with the Resettlement Officer of the district to discuss future training and placement in suitable employment and to plan the timing of this. As regards bilateral amputees these will follow a similar programme but they cannot of course stand or crutch walk. Emphasis is put on increasing the strength of their upper limb and trunk muscles, on reaching a stable sitting balance and on the ability to transfer on their own from bed to wheelchair and from this to bath and lavatory. Wheelchairs are ordered for these patients and they are fully trained in their use. As regards upper limb amputees graded manually resisted exercises for the muscles controlling the shoulder blade and joint are started straight away, also for the muscles working on the elbow joint in below elbow amputees. Work using pulleys and weights comes next.

Movements of the opposite shoulder and shoulder girdle will control the artificial limb so these are given work to increase strength and mobility. Inbalance often tends to cause faulty neck and upper limb posture and this should be corrected. Firm bandaging is started when the sutures have been removed and the wound has healed. A leather cuff to which is attached cutlery or a pencil is strapped on to the bandage whatever the length of the stump. This encourages the patient to use the stump actively and will prevent him from becoming one-handed minded. There is an arm training school at Roehampton under the supervision of an occupational therapist. Here amputees are shown how to play draughts, to do carpentry, to work on machines, operate a switch board and do other jobs.

In 1967 a new building situated between the limb-fitting centre and Queen Mary's hospital was formally opened by the Minister of Health. It houses the Biomechanical Research and Deve-

lopment Unit, known as Bradu, where work takes place which aims at improving the current design of prostheses and the total treatment of the amputee. Some of the work taking place at present includes controlled environment treatment for an amputation stump. Work on this started after the failure of the immediate fitting of a prosthesis. Here a transparent flexible pressure bag sealed incompletely by a Hovercraft skirt is filled with warm sterile air above atmospheric pressure, between 10 and 50 mm of mercury. The pressure varies, the high reading controlling the oedema the low one allowing blood to enter the stump.

As the air is warm it is of course drier. Early results from London and Seattle are very good and there are at present ten machines in use. A Mark 2, quieter and neater, is now ready. The bags are made commercially and the cost is now down to £3. This treatment is of course useful in other limb wounds not only amputation ones. The second impressive project of Bradu design is a huge carbon dioxide cylinder for fool-proof recharging of the smaller units used for powering upper limb movements. The recharging takes place at night and the units are in action throughout the day. Movements are initiated by valves and there are usually three, one for the arms and two for the fingers and hooks. Work was also taking place in the clinical section, on sockets.

Finally, I would like to end this talk by leaving you this statement to chew on: an amputation is not simply an operation of destruction. Rather one of construction, to form a new organ of locomotion and so make the patient mobile again. It is only by the combined effort of all members of the team that the maximum restitution of function can be achieved. The amputee must understand that he is a member of this team, the most important member in fact, and that only by his help and full co-operation will the final objective of amputation which is mobility be achieved.

I do hope that this visit to Roehampton and the lessons that I learnt there will be of value to us in Malta and that as a result the lot of the amputee will be more cheerful. The man who needs most help is of course the elderly man and on another occasion I hope to deal more fully with the problems peculiar to this age group and at the same time to pinpoint modern trends in amputations and in prostheses.