REHABILITATION OF AMPUTEES IN UGANDA

THE JAIPUR/MAHAVEER LIMB SYSTEM EXPERIENCE

A JOINT ROTARY/WORLD REHABILITATION FUND PROJECT

A PRELIMINARY REPORT COMPILED BY

THE KUMI HOSPITAL REHABILITATION TEAM

LED BY DR.WANUME KALE

1. **TRIBUTE:**

Tribute is paid to Rotary Club of Kampala North for their commitment in catering for the rehabilitation needs of amputees in Uganda. The club initiated the Jaipur/Mahaveer limb system in Uganda.

Tribute is paid to Hon. James Mwandha MP. for the disabled Eastern Region. He has been instrumental in the success of World Rehabilitation Fund Operations in Uganda.

Tribute is paid to the Kumi Hospital Administration who have agreed to partner with World Rehabilitation Fund in rehabilitation work in the surrounding districts.

Tribute is paid to the Rehabilitation Desk of Ministry of Health, and the Department of Orthopaedics under whose authority this rehabilitation work is being done.

2. **AMPUTEE POPULATION:**

The amputee population in Uganda stands between ten thousand and fifteen thousand, concentrated in the North, North-East, and West of Uganda. This number is on the increase because of the ongoing civil conflict and accidents.

World Rehabilitation Fund has concentrated its energies in the rehabilitation of amputees in the Districts of Kumi, Soroti and Katakwi using the Jaipur/Mahaveer Limb system, in collaboration with the various stakeholders who include representatives of the Disabled and District Rehabilitation Officials.

3. THE REHABILITATION TEAM:

A new concept of a professional teamwork has been introduced, utilizing and maximizing the abilities of different rehabilitation health workers for the benefit of the amputee. The rehabilitation team comprises of the following health workers:

- The Medical Officer
- The Clinical Officer
- The Prosthetist
- The Physio-Therapist
- The Social Worker
- The Nurse
- The Occupation Therapist
- The Patient

Each individual of the Rehabilitation Team plays his/her special part, but in collaboration with the others for the success of the team. The patient has been made the centre of interest of the team while being part of the team and making contributions for his/her rehabilitation program. With the rehabilitation team approach we have been able to achieve a higher level of rehabilitation for the Ugandan Amputee.

4. RESPONSIBILITIES OF THE REHABILITATION TEAM:

i) Assessment of the amputee; patient history including medical history, social history, personal history, vocational history, and family history.

ii) Discussion of objectives,expected outcomes for the amputee.

iii) Preprosthetic training

iv) Prosthetic fitting

v) Gait training

vi) Post gait training evaluation and discharge

vii) Return of amputee to his/her community.

viii) Follow up program.

ix) Medical treatment.

The rehabilitation of the Ugandan Amputee needs a team with sufficient theoretical knowledge but also a greet deal of practical experiences. The team needs to care for 60 – 100 amputees in order to have the necessary experience and confidence.

5. METHOD OF AMPUTEE CONTACT:

Part of the rehabilitation team goes out weekly to the counties, sub-counties and villages in Kumi, Soroti and Katakwi districts. This is done with collaboration of the local authorities and representatives of the disabled. The technical team assesses and selects those amputees who can be treated (fitted). While recommending management for those who cannot be treated (fitted).

6. STATE OF AMPUTEES IN THE VILLAGES:

The Ugandan amputees are found in the villages in one of the following states;

i) In despair and abandonment by family and community. Often this amputee is left crawling about and has no social-economic contribution to self or to the community. He/she often will not believe that rehabilitation is possible and his/her status can be improved.

ii) Ambulates on crutches, sticks, or self made prostheses, and is engaged in some form of social economic activity. This amputee is the best candidate with self-esteem and drive. A good level of rehabilitation will be achieved.

iii) Once given a prosthesis but it is unused or broken, and has been unable to have a follow up or a replacement. This amputee is very sceptical of the rehabilitation program and assumes that after

getting a prosthesis he will be abandoned again. The *'déjà vu'* attitude.

7. THE AMPUTEES WHO WILL NOT BE TREATED (FITTED):

The following categories of amputees are not brought to Kumi Hospital for treatment (fitting).

i) The weak and elderly amputee who is judged to be unable to learn or to not having enough physical and mental reserve to use a prosthesis.

ii) The amputee with frank sepsis of the residual limb.

iii) The amputee with gross contracture of the residual limb. Mild contractures will not contraindicate treatment (fitting) using the Jaipur/Mahaveer limb system.

iv) The amputee who is so well adopted to his/her present mode of locomotion that it would be futile to give him/her prosthesis. This may be a locally made prosthesis or adopted crutches. This amputee has a lot of self esteem and drive.

v) The amputee with mental or debilitating physical disease.

vi) The amputee with serious disease of the opposite limb.

8. STAY AT THE REHABILITATION CENTRE (KUMI HOSPITAL):

Three to five amputees are brought to Kumi hospital every week. Prosthetic fabrication takes one to three days adjustments to the prosthesis and gait training take five to seven days. Exceptionally training extends to two or three weeks. The short stay at the rehabilitation centre is aided by the following facts:

i) The short time needed to fabricate the Jaipur/Mahaveer limb.

ii) The average Uganda amputee is younger and traumatic and therefore has fairly good musculature of the residual limb.

iii) The average Ugandan amputee has been mobile in his/her own way for years, and therefore the residual limb size has shrunk to a fairly constant volume.

iv) To the average Ugandan amputee, being able to walk again is a dream come true. He/she will therefore do his/her best to learn in the shortest time possible.

9. THE JAIPUR/MAHAVEER LIMB SYSTEM:

The Rotary/World Rehabilitation fund program has set out to do the following:

i) To treat (fit) amputees.

ii) To assess the suitability of the Jaipur/Mahaveer limb system to the Ugandan Rural Condition.

iii) Research the advantages and attributes of working as a rehabilitation team.

iv) Designing a community based rehabilitation program with specificity to amputation disability.

There is no attempt to compare and contrast the function of Jaipur/Mahaveer limb system with other systems. The Jaipur/Mahaveer limb system is not like the original Jaipur foot system. It has been remarkably modified with new inputs as well as modifications introduced by the Kumi Hospital Orthopaedic workshop.

Compared to other limb systems and technologies, the Jaipur/Mahaveer limb system is one of the cheaper and more affordable systems in use today. The equipment and raw materials cost a fraction of the cost of the more sophisticated systems. The fabrication time is a fraction of the time taken to make the more sophisticated limbs.

The Jaipur/Mahaveer limb system carries a criticism of difficulty in alignment, consequently the prosthetist has to be skilled and well

experienced to overcome this handicap. The simplicity of the system makes it attractive for a community based amputee service if managed in the right way. It has taken the Rehabilitation team one and half years to acquire the necessary experience and organisation.

10. TREATMENT (FITTING) THE AMPUTEE:

The amputees treated in Kumi Hospital had their amputation surgery many years ago, and the majority did not have the ideal surgery for prosthetic fitting.

16% of the treated group had surgery	0 – 1 years ago
22% of the treated group had surgery	2 – 5 years ago
20% of the treated group had surgery	6 – 10 years ago
42% of the treated group had surgery	more than 11 years ago.

Of this treated group 62% had no previous prosthetic experience, while 38% had had a prosthesis made in Mulago Orthopaedic workshop or Kumi Orthopaedic workshop. All the previous prostheses seen were not in use for various reasons.

A non-ideal residual limb will be more difficult to fit because of the following features:

i) Bone prominence
ii) Adherent scar
iii) Pain and tenderness secondary to bone or neuromas.
iv) Too much redundant tissue
v) Contractures

A non-ideal residual limb calls for skill and experience on the part of the prosthetist in order to have a successful fitting. One characteristic of the Jaipur/Mahaveer limb system is that the transtibial socket is open ended and there is no end weight bearing. This makes the system adaptable to

non-ideal residual limbs, which are the majorities in the Ugandan amputee population. Surgical revision of residual limbs in Uganda to make them more suitable for prosthetic fitting is a non-practical venture.

Residual limb preparation before fitting in Kumi Hospital takes a short time because of the following factors:

i) The very long period which have elapsed since the amputation surgery.

ii) The fact that the majority of amputations were due to trauma and therefore there is good musculature and circulation.

iii) The fact that the majority of the amputees are physically active.

The use of walking sticks, locally made crutches, locally made prosthesis, and crawling has led to the various degrees of contractures, varus or vulgus deformities. Mild to moderate deformity does not exclude prosthetic fitting using the Jaipur Mahaveer limb system, function being emphasised more than cosmesis.

11. TRAINING OF PROSTHETIC USE; GAIT TRAINING:

This is the most important task for the rehabilitation team. It may be said the however well the prosthesis is made, there will be certain failure if the amputee is not trained in its use. Failure in proper training has led to non-use of many prostheses in Uganda.

Whereas the physiotherapist plays the vital role in training, the rehabilitation teams as a whole takes interest, giving vital observations and suggestions. The amputee is a participant who gives vital feedback information. Often the amputee is so eager to walk that in the excitement he will overlook or fail to report danger signs indicating problems with the prosthesis.

The rehabilitation team has provisionally produced a manual as to the manner the training of the amputee should proceed in the Ugandan setting.

If enough time cannot be given for gait training, it is better to retain the prosthesis till such time that both the amputee and the trainers have enough time to go through the training process.

12. TRAINING FOR CARE OF THE PROSTHESIS, THE RESIDUAL LIMBS, AND SOCKS:

To the Ugandan village amputee, the prosthesis is something out of his/her world. The amputee is taught to know the prosthesis, its parts, the way it is made, the way it relates to the residual limb, its strength and its weaknesses. He/she is taught to look out for signs of wear and tear and what to do in case this happens.

Proper care of the residual limb and the prescribed socks determine the proper continuous usage of the prosthesis. The amputee wearing a prosthesis submits the residual limb to new mechanical forces and a new environment which may lead to one of the following skin conditions some of which have been seen:

(i) Blister formation
(ii) Maceration
(iii) Intertrigo
(iv) Abrasion
(v) Ulceration
(vi) Tissue proliferation
(vii) Dermatitis:- irritant or allergic

Development of any of these skin conditions leads to the immediate cessation of the use of the prosthesis. Simple rules of personal hygiene and cleanliness for the residual limb and the socks prevent the

development of such skin conditions; not forgetting that a proper socket fit is of primary importance in their avoidance.

The rehabilitation team has prepared guidelines for the education of the amputee about the prosthesis and personal care for the residual limb and socks.

13. **PERFORMANCE OF PARTS OF THE JAIPUR/MAHAVEER LIMB SYSTEM**:

The Jaipur/Mahaveer limb system is a simple, rugged, exoskeletal limb system whose features and parts are easy to explain and observe performance.

1. The sockets and shank:

The sockets and shank are made of molded high-density polyethylene (HDPE) pipe. This molded pipe has proved to be very durable. Of the 54 patients of the follow up group, there is not a single breakage of the socket or the shank.

2. The Jaipur foot:

The following attributes have been recognised:

i) It does not require a shoe and has a high degree of cosmetic acceptability by the Ugandan amputee population.

ii) It is indeed waterproof and made of durable rubber.

iii) Its mild degrees if dorsiflexion, eversion and inversion allows the Ugandan amputee to work, in the fields, perform domestic chores, squat when necessary, walk on uneven surfaces, and be able to ride a bicycle.

One important observation has been that the Jaipur foot is slippery in mud, a setback which could be corrected by corrugating its sole which is indeed smooth.

The rehabilitation team has established that a Jaipur foot used daily for seven to twelve hours, in the Ugandan setting, starts to break down in six to twelve months.

3. THE JOINTS.

In the transfemeral prostheses, the following joints have been used:

(i) Plastic Knee joint.

(ii) Oilone Knee joint

(iii) Metal (side bars) knee joint

In the follow up experience only the metal Knee joints have been found to be broken, by four patients.

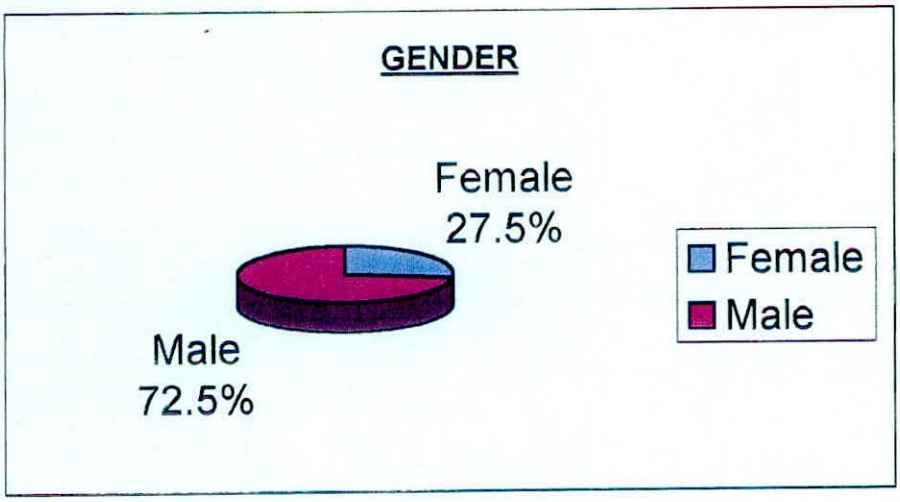
14 THE FOLLOW UP EXPERIENCE:

Statistics:

Total number of amputees treated (fitted) in 18 months - 313 amputees.

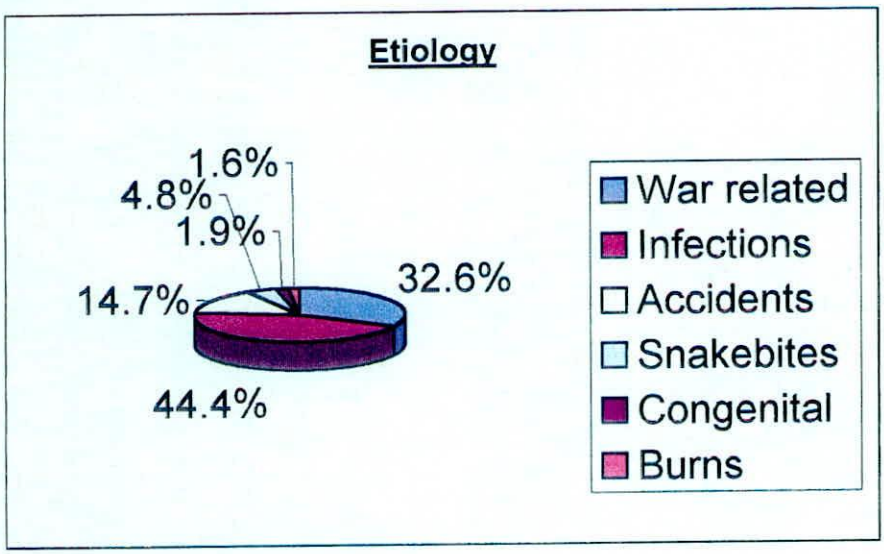
1 **Gender:**

	Female	**Male**
No.	**86**	227
%	27.5%	72.5%



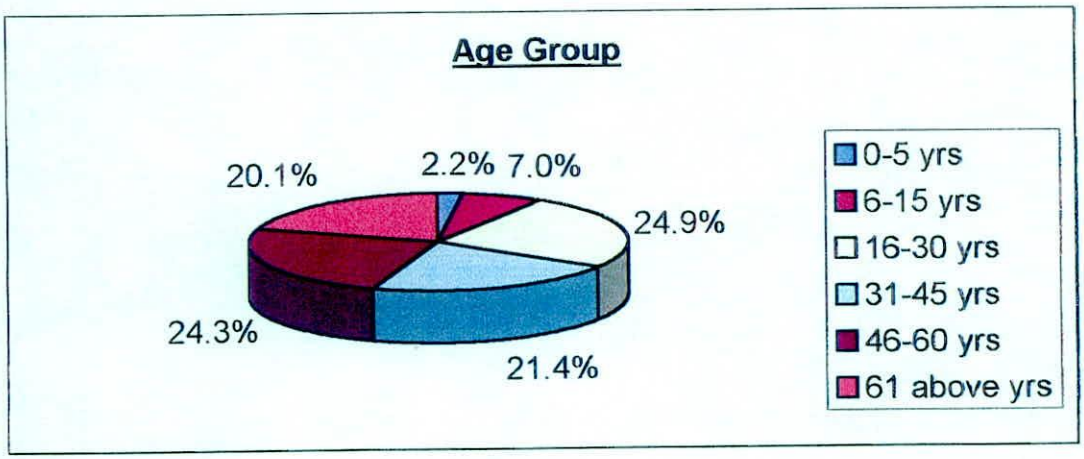
2 **Etiology:**

	War related	Infections	Accidents	Snakebites	Congenital	Burns
No.	102	139	46	15	6	5
%	32.6%	44.4%	14.7%	4.8%	1.9%	1.6%



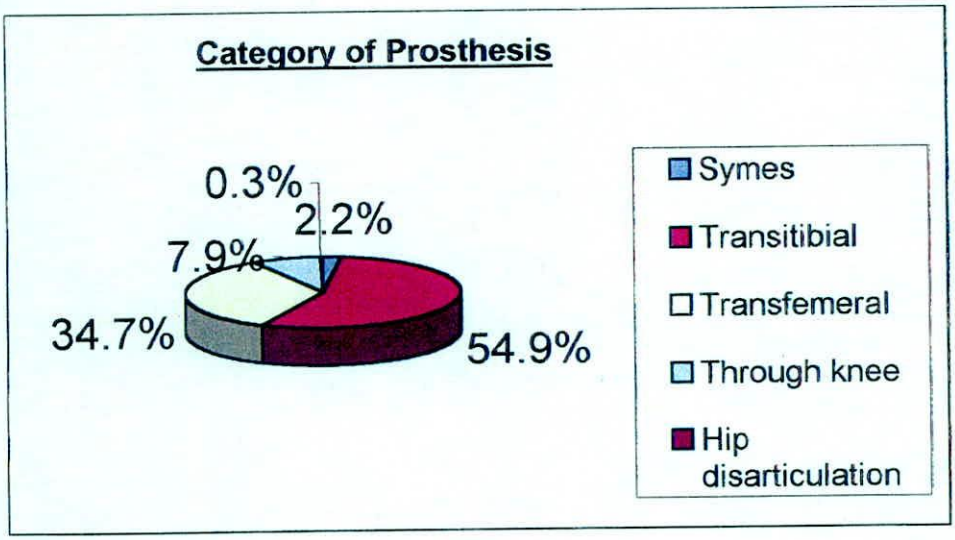
3 **Age Groups:**

No	0-5 yrs	6-15 yrs	16-30 yrs	31-45 yrs	46-60 yrs	61 above yrs
%	7	22	78	67	76	63
	2.2%	7.0%	24.9%	21.4%	24.3%	20.1%



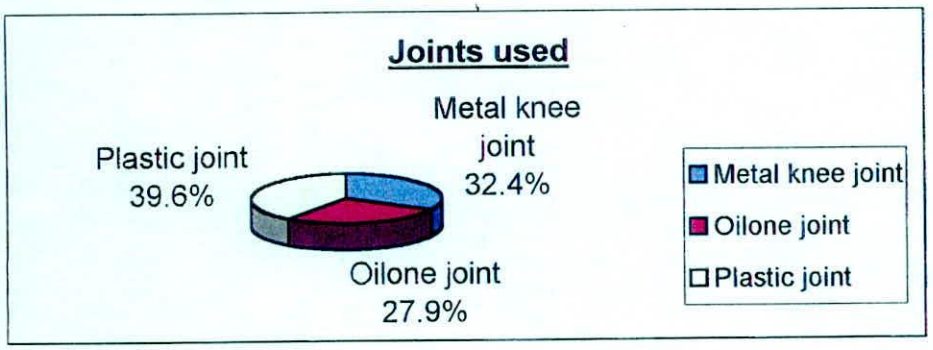
4 Category of Prosthesis:

	Symes	Transitibial	Transfemeral	Through knee	Hip disarticulation
No.	7	174	110	25	1
%	2.2%	54.9%	34.7%	7.9%	0.3%



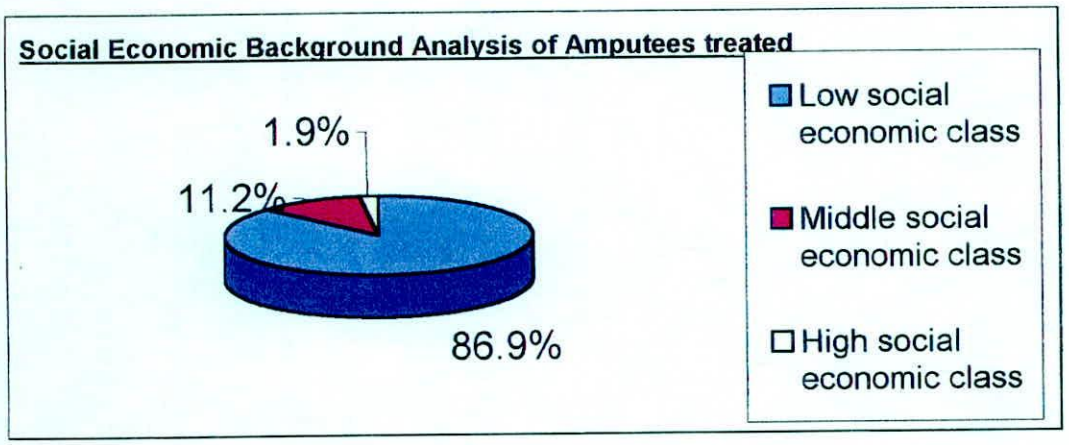
5 **Joints used:**

	Metal knee joint	Oilone joint	Plastic joint
No.	36	31	44
%	32.4%	27.9%	39.6%



6 Social Economic Background Analysis of Amputees treated.

	Low social economic class	Middle social economic class	High social economic class
No.	272	35	6
%	86.9%	11.2%	1.9%



In the ongoing follow-up program which started four months ago, already 54 patients have been visited in the districts of Kumi, Soroti, and Katakwi. These have been surprise visits intended to find the amputees in their home environment and doing their normal daily chores. 51 of the 54 patients were found wearing their prostheses, the majority using the prosthesis for 7 to 12 hours a day.

Of the follow up group 66.7% are male, 33.3% are female. Of the follow up group 58.2% are transtibial amputees, 23.6% transfemeral amputees, 12.7% are through knee amputees and 5.5% are symes amputees.

A simple protocol has been followed in order to establish the following:-

(a) Whether the patient has used the prosthesis or not.
(b) The effect of the prosthesis on the residual limb.
(c) Deterioration or breakage of the prosthesis.
(d) Economic benefits.
(e) Social benefits.

State of Residual limbs:

In the follow up group 77.8% of the amputees showed atrophy of the residual limbs. This was deduced from physical examination and the fact that more socks had been added to improve the socket fit.

State of Liners:

All transtibial sockets are made with a liner using pilite. All liners examined were shrunk, worn or torn and needed replacement.

Foot analysis:

Of the follow up group of 54 amputees only 2 wear shoes. Of the 54 feet examined 16 of them (30%) were in various stages of wear and tear erosion or breakdown, after maximum use for 6 to 12 months.

Economic improvement:

Of the follow up group 93% are able to cultivate their gardens or make them bigger. Five amputees are rearing cattle, 2 amputees going fishing in the lake. 8 amputees have started some small scale business.

Social improvement:

In the follow up group, all the active amputees have improved themselves socially. In particular 3 amputees have been elected to positions of responsibility, 7 amputee children have gone to school, and 2 male amputees have got married.

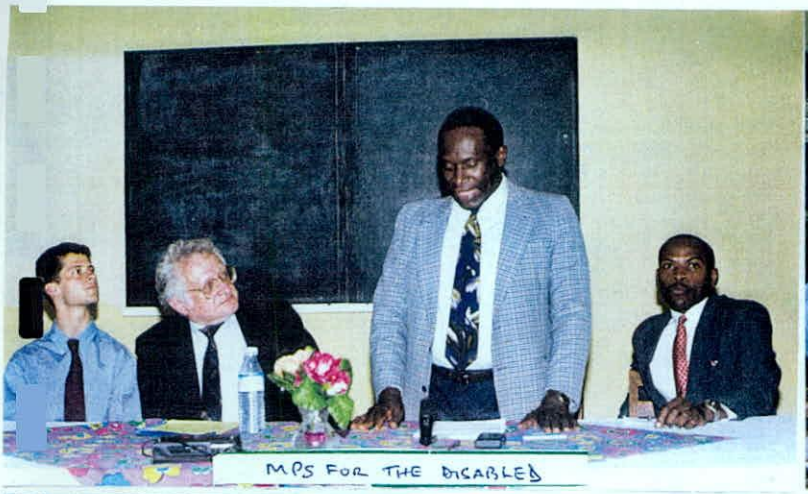
14. CONCLUSION:

This a preliminary report compiled for the benefit of the stakeholders. A conclusive report will be produced in the middle of the next year at the end of the initial follow up program.

However what is obvious so far is that the Jaipur Mahaveer Limb System is already making the Ugandan Rural Amputee Mobile.

It is strongly recommended that the principle stakeholder THE AMPUTEE POPULATION IN UGANDA get more involved in the program for continuity and rational sustainability.

Plate I	Some of the stakeholders
Plate 2	Group of amputee children
Plate 3	Group of adult amputees
Plate 4	Workshop activity
Plate 5	Amputee gait training
Plate 6	Amputees using the prostheses
Plate 7	Residual limbs; the reality
Plate 8	Locally made prostheses
Plate 9	Jaipur feet wear & tear
Plate 10	Rehabilitation team follow up visits
Plate 11	Wear & tear of liner



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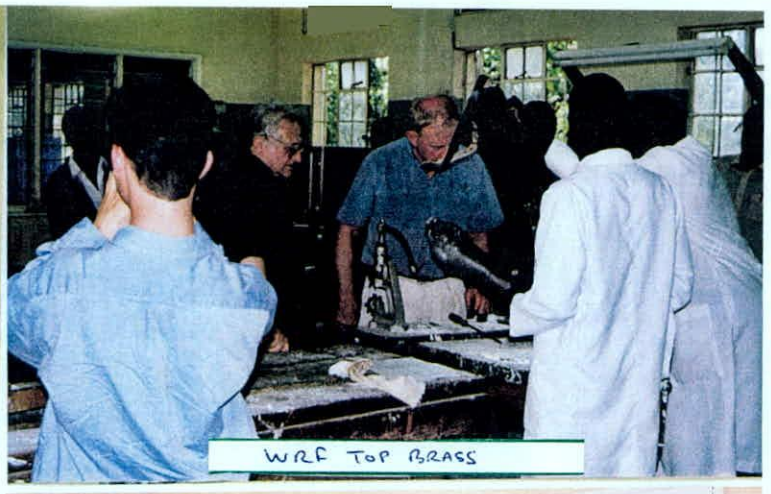

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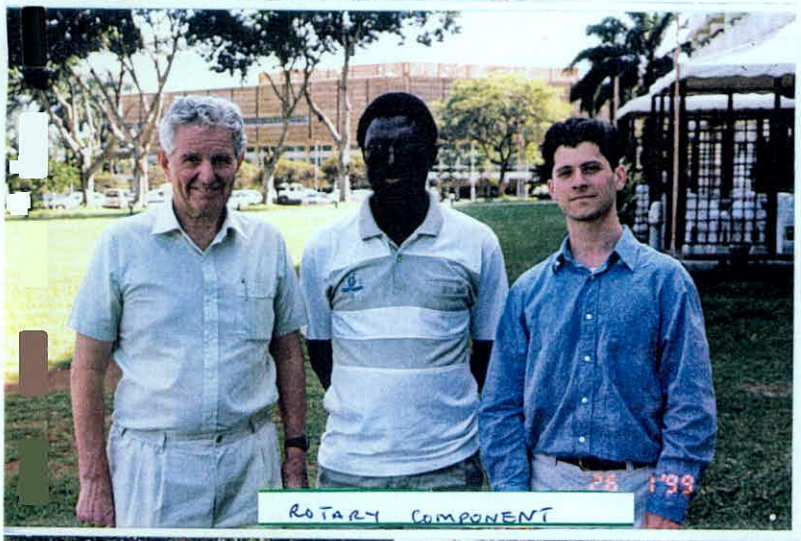


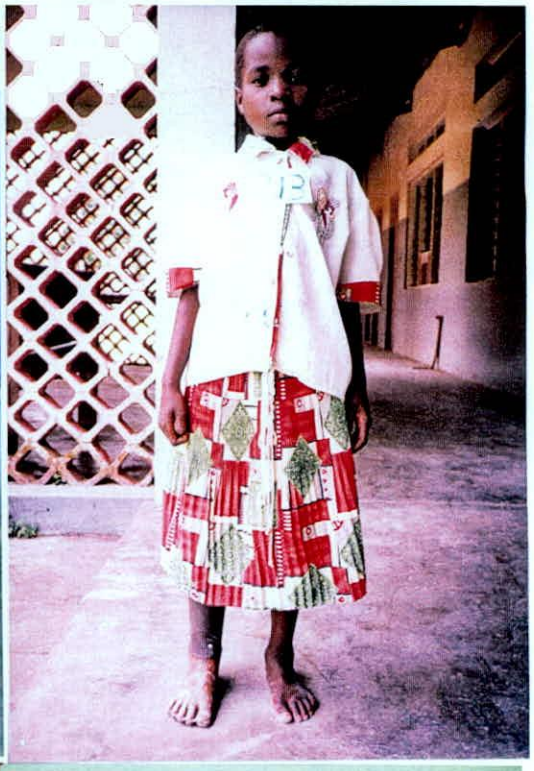
ROTARY COMPONENT

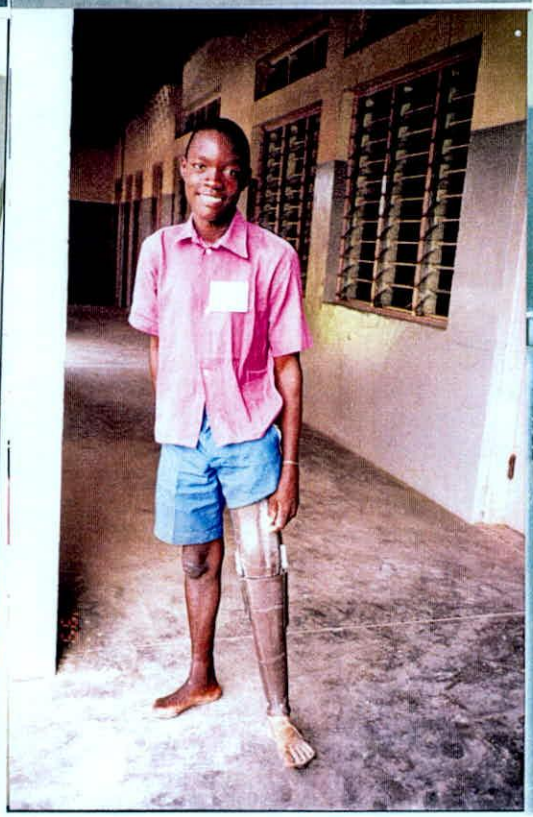
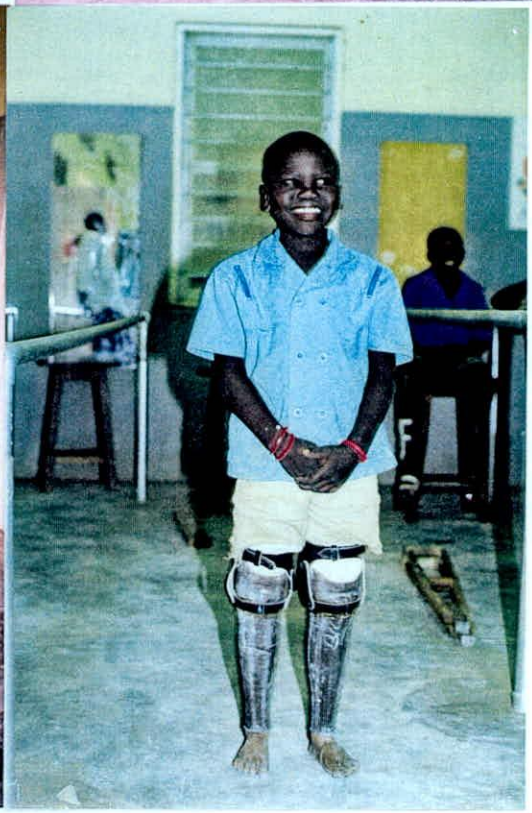
UNICEF INTREST

REHABILITATION TEAM

REHABILITATION SPECIALIST



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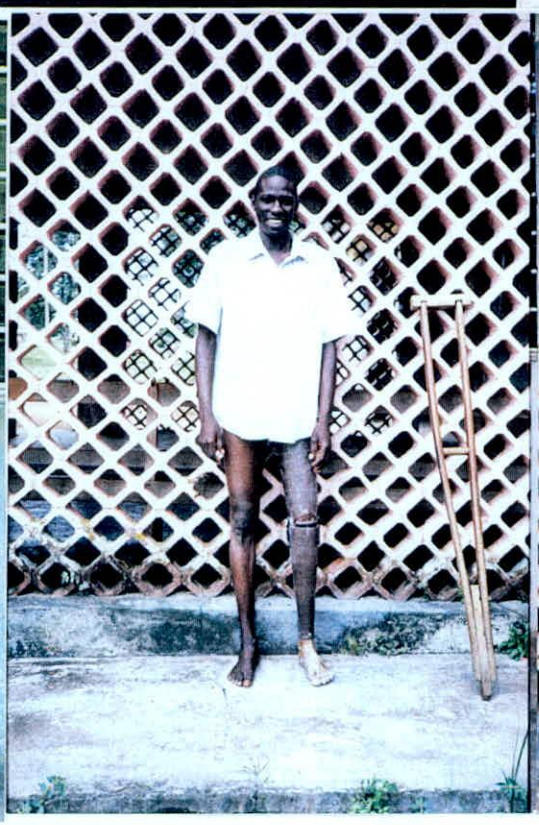

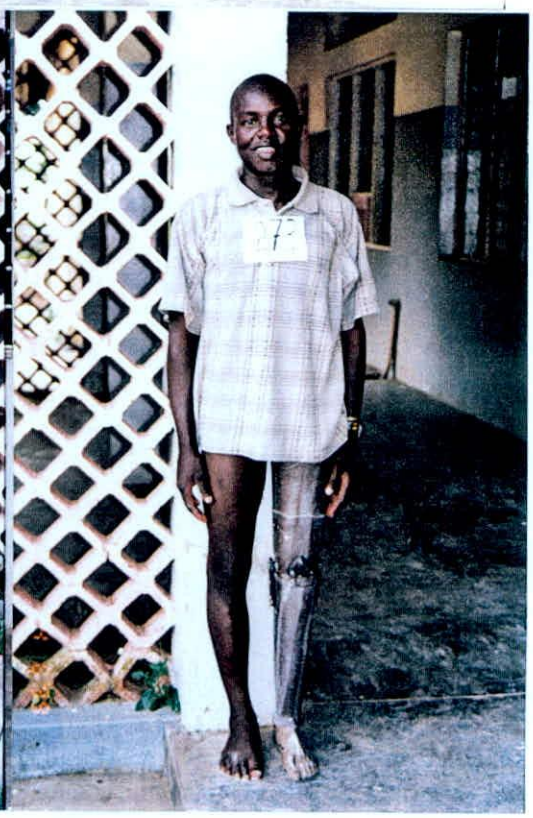
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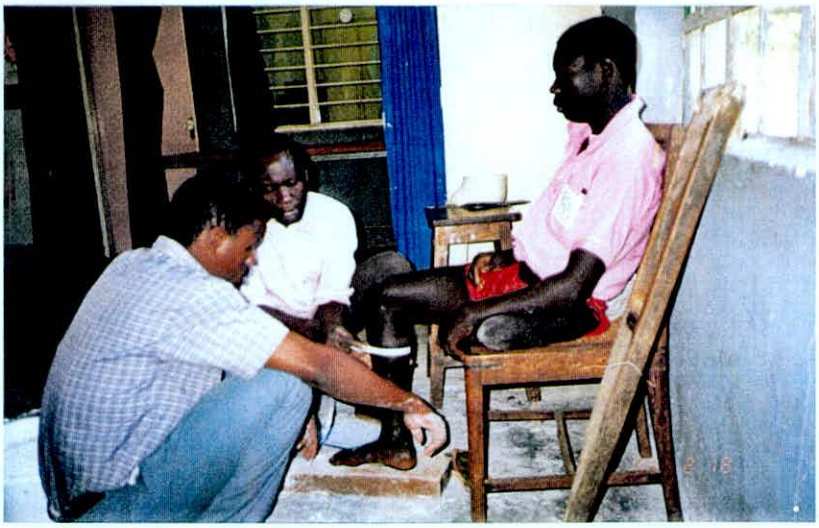

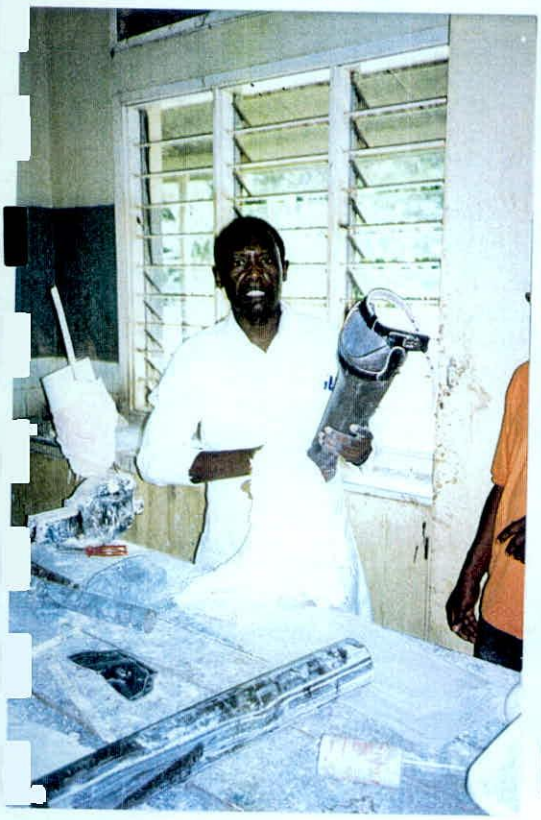

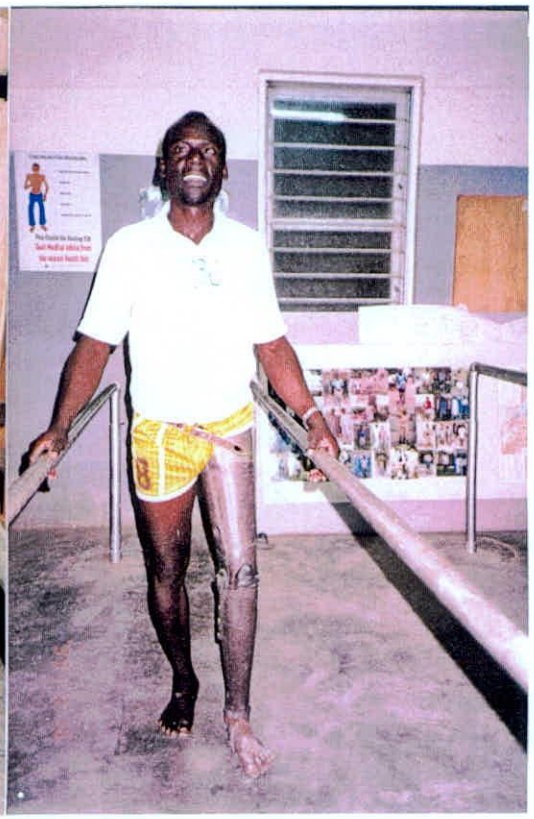


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CAREFULLY


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