

ANNEX B

Final Report Guidelines

The report is to be a maximum of 4 sides of A4 size paper excluding the Output to Purpose report

Date

Wednesday, 14 January 2004

Title Of Project & Project Ref. No.

Prefabrication of Knee Ankle Foot Orthoses (KAFO) for low cost mass production and rapid fitting. Ref: C1-P12

Organisation

Jaipur Limb Campaign

Reporting Period

from 1st April, 2001

To 31st December 2003

Anticipated Completion Date

Completed

1 Goal Purpose and Outputs :

GOAL

To provide rehabilitation services to a greater percentage of the estimated 4 million people in India who are in need of wearing an orthotics/brace; to prevent further disability, and to enhance individual mobility.

PURPOSE

To create a system for mass production of appropriate low cost orthoses for wider distribution, rapid fitting and product testing.

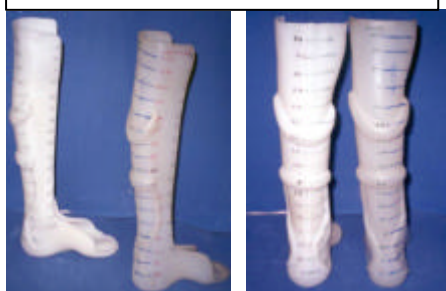
OUTPUTS

- Dies developed and fabricated.
- Orthotics components mass-produced.
- Approximately 8,000 people fitted.
- Product tested through training institutions.
- Product field-tested by rehabilitation NGOs.
- Approximately 15 trainers and 5 technicians trained in using this system
- Orthoses production costs reduced.
- Complicated polio cases due to lack of treatment reduced.
- Awareness rose about the need and benefit of wearing orthoses.
- System adopted and replicated nationally by orthopaedic workshops and government agency.

PFKAFO Components



PFKAFO components master piece



POP dies



Metal dies



Prefabricated components



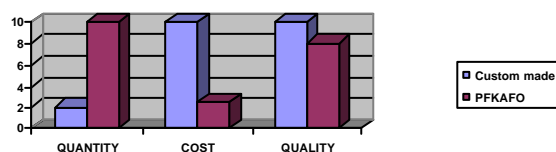
2 Summary of work carried out in this period :

Objectives:

1. Dies developed and fabricated – Measurements of polio legs of both sexes at various levels were collected and analysed on the basis of which 10 sets of Plaster moulds were developed. Wooden replica of the same was made and plastic leg shells were prepared by hand draping. Tested on children and moulds kept on modifying. When optimum acceptance was achieved the same was again copied with Positive plaster mould. POP dies were made for casting and later steel casting was done to get metal dies. In this process, 40 pieces of metal dies have been produced. 36 dies are 0-8 sizes of left and right legs both lower and upper parts. Size 9, only lower parts have been developed. It took long time than anticipated. Most of it is handwork and lot of work had to be done outside on which Mobility India (MI) had little control but all got done with lot of alterations and modifications. Two dies had to be reproduced. To step up the production all dies had to be modified to suit automatic plastic moulding machines.
2. PFKAFO consists of prefabricated lower and upper plastic shells of leg, a pair of orthotics knee joints and uprights to connect the two shells according to individual's length of the leg, 4 pieces of straps and other accessories. Everything has been developed in house with the help of outside manufacturers.
3. 8000 pieces of PFKAFO components have been mass produced and getting routinely fitted at Mobility India and its partner organisations all over India. Few other NGOs and even commercial enterprises are now taking these parts regularly from MI. MI conducted several training programmes in house and in other National Institutes to make the technology familiar to professionals and organisations who are providing orthoses to people with disabilities, mostly polio. So far, 220 professionals have been oriented with this new technology and response is quite promising. Mi runs long –term training programme on fabrication of orthoses and PFKAFO Technology is now part of the training programme.
4. PFKAFO technology has been field tested at various places across the country and on the basis of the feedback, MI kept on improving the quality of the products. Shrinkage was a big problem and MI introduced all major plastic industries and raw material supplier to overcome the problems. 90% of the shrinkage problem has been solved and rest had to be accepted due to the moulding technique which MI had to opt for.
5. Besides, PFKAFO Technology, the whole sector got lot of importance to media and public. This technology has been on all major Indian TV channels. All top of Indian Cricket Stars mostly pace bowlers came forward to promote this technology seeing its huge benefit to the people with disabilities, their families and society at large.
6. Technology was introduced to Government of India through participation in their programme, national seminar and training Institutes. Technology got appreciated and won best award in both national seminar and exhibition.

3 Overall Results of findings obtained by the project:

- A complete alternate system of low cost orthoses (PFKAFO) has been developed for wider distribution and rapid fitting with the help mass produced prefabricated components. MI now has a ready stock of hundreds of such PFKAFO components which could be supplied all over the country.
- Total cost of the orthoses in compare to present market rate in India, came down to one fourth. Besides, cost factor, now lot of people could be fitted easily in a shorter span of time. Production of orthoses in MI alone has been increased by four folds.



- Thousands of children and grown ups are now fitted and being fitted regularly with orthoses and to many it was the first time experience of standing on their own feet and walking after a gap of 5-15 years. Many started going to school walking on their legs for the first time. Children are wearing the orthoses most of the time, so not develop secondary deformities so, almost a new life, no need to go

to hospital regularly. The whole technology is saving lot of money for all.



- MI, its partners are now in position to take the new responsibilities to fit hundreds or thousands of people with disabilities with this new technology at a very quickest possible time. This technology is also suitable for mobile service which MI is doing on regular basis to offer the service at the doorstep of the disabled children at quite often children are having a new life on the same day.
- The greatest beneficiaries of this technology are people with disabilities especially children and women. No need to wear heavy leather black boots with heavy metal callipers instead, an orthoses of their choice and they can choose any kind of footwear even many walk barefoot.

4 Implications of the results or findings for achieving the outputs and purpose of the project:

The overall goal of the project was to provide rehabilitation services to a greater percentage of the estimated 4 million people in India who are in need of wearing an orthotics/brace; to prevent further disability, and to enhance individual mobility by developing a technology which will be of good quality, could be fitted to large number of people with disabilities in a quicker time and at an affordable cost – all these, have been achieved. This new technology is available for everybody and its acceptance is growing day by day. Everybody knows the limitations of any prefabricated or readymade items. It cannot be fitted to all but majority who needs such types of orthoses, now no need to spend days in visiting workshop and spend lot of moneys. In Mobility India 70% intended users can collect the orthosis on the same day which is a big relief to the person and family members. So far, result shows that MI could fit 60% of its client with complete PFKAFO, 20% has to give measurement of only lower parts and rest 20% has to be measured/casted for a custom made KAFO as their legs developed secondary deformities due non availability of such orthoses at earlier stage. The best aspect of it is user's satisfaction – young girls love it. Parents do not mind even to buy a good shoe to ensure their children look like others. PFKAFO Technology has already become quite popular in India. Spin off from PFKAFO technology is also helping lot of people with disabilities who need other kind of orthoses such as Ankle Foot Orthoses (AFO) or night splints. However, still there are lot of areas where the technology can be refined further to make it of very high quality, larger acceptance and further lower cost but it needs big investment.

5 Priority Activities tasks for follow-up in order to pursue the Goal:

What action is necessary to promote the findings of the work to achieve their developmental benefit? This should include a list of publications, plans for further publications, and recommendations for further dissemination, as appropriate. For projects aimed at developing a device, material or process, specify :

- a what further studies need to be done

Wider dissemination of such kind of innovative appropriate technology - to share the findings with key players in the field of disability, rehabilitation and development within India and in neighbouring low income countries - Nepal, Bangladesh and Sri Lanka and in Africa - Angola, Ethiopia, Mozambique, all countries that JLC and MI have project partnerships and links. It would be better to produce a video and manual, sets of posters, slides and other materials to show how PFKAFO components are used and the benefits in terms of speed of delivery and reduced costs and early intervention especially in the case of children affected by polio. Practical workshop demonstrations and other presentations need to be periodically organised for all key players such as Prosthetics & Orthotics professionals/technicians, rehabilitation NGOs, government department and agencies whose remit is to deliver rehabilitation services to people with disabilities.

- b how any product or prices will be made available to intended users

MI has the policy to provide such orthosis at free of cost or at subsidised rate to people who cannot pay but at the same time MI is also now in position to sell some to people who can pay. However, product is ready for anyone to purchase - the whole range has been divided in 4 groups:

- Below knee (small) Ankle Foot Orthosis – Rs.250 (Aprox. £4) and large Rs.350 (Aprox. £6)
- PFKAFO Knee Ankle Foot Orthosis (small) Rs.1000 (Aprox. £15) and large Rs.1250 (Aprox. £18)

c what further stages will be needed to develop, test & establish manufacture

To bring the cost further down and to get best quality, it would be better if MI could go for Injection moulding but it would cost an investment of £400,000.

d how, and by whom, will the further stages be carried out & paid for.

Besides investing in manufacturing, MI need to develop two teams of Trainers, each consisting of two orthotists who will be assisted by a therapist to conduct workshops at 4 regional venues and at three teaching institutes in India to share knowledge and skills on PFKAFO with rehabilitation workers and trainees. The same team need to travel extensively within India and outside India. MI also needs to participate regularly in Orthotics and Prosthetics Society of India (OPSI) biennial conference and World Congress of International Society for Prosthetics & Orthotics (ISPO) for wider dissemination. Beside India, this technology has huge potential in Africa, especially in countries where polio is very common in very recent past. Both mechanical and field testing need to be done periodically to constantly improve upon the quality and to ensure more percentage of people with disabilities could be fitted with PFKAFO. MI and JLC, both are trying to raise the fund to make optimum use of such kind of successful and promising technology which will give benefit to millions of people living in developing countries which would ensure a child to go school and adult to make income - a better quality of life.



Millions waiting for their turn...



Mothers want their child to walk like others



Happy group – a new life for all, except for Krishna on right – he has to wait as his leg is badly deformed

6 Summary of financial expenditure:

7 Name and signature of author of this final report:

OUTPUT TO PURPOSE SUMMARY REPORT				
Title: Prefabrication of Knee Ankle Foot Orthoses (KAFO) for low cost mass production and rapid fitting.				Country: India
MISCODE: [to be inserted by DFID]				
Report No. 9		Date: Wednesday, 14 January 2004	Project start date: 1 st July, 2001 Project end date: 31 st December 2003	Stage of project: <i>Final</i>
Project Framework				
Goal statement: To provide rehabilitation services to a greater percentage of the estimated 4 million people in India who are in need of wearing an orthotics/brace; to prevent further disability, and to enhance individual mobility.				
Purpose statement: To create a system for mass production of appropriate low cost orthoses for wider distribution, rapid fitting and product testing.				
Outputs:	OVI:	Progress:	Recommendation/actions:	Rating:
Dies developed and fabricated	40 dies developed and fabricated	Completion of dies <ul style="list-style-type: none"> • 40 metal dies have been produced. • 36 dies are 0-8 sizes of left and right legs both lower and upper parts • Size 9 – only lower parts • Two dies had to be reproduced. 	To set up the production all dies had to be modified to suit automatic plastic moulding machines. In future it would be better if investment can be made to convert all the dies for injection moulding	
Orthotics components mass produced	Orthotics components mass produced	Prefabricated lower and upper plastic shells, a pair of orthotics knee joints and uprights, 4 pieces of straps and other accessories.	Everything has been developed in house with the help of outside manufacturers.	
Approximately 8,000 people fitted.	8000 pieces of components produced	Thousands have been fitted and it is getting routinely fitted at Mobility India and its partner organisations all over India. Few NGOs and even commercial enterprises are now using these parts	Wider dissemination through workshops, exhibitions and media	
Product tested through training institutions	220 professionals oriented with this new technology	Several training programmes were conducted in house and in other National Training Institutes to professionals and organisations.	In MI's long –term training programme, PFKAFO Technology is now part.	
Product field-tested by rehabilitation NGOs	2 out of 10 lower shells were breaking at initial stage	The technology has been field tested at various places across the country. MI kept on improving the quality of the products. As shrinkage was a problem MI introduced all major plastic industries and raw material	90% of the shrinkage problem has been solved and rest had to be accepted due to the moulding technique which MI had to opt for.	

<p>Awareness rose about the need and benefit of wearing orthoses.</p> <p>System adopted and replicated nationally by orthopaedic workshops and government agency.</p> <p>Complicated polio cases due to lack of treatment reduced.</p> <p>Orthoses production costs reduced</p>	<p>Media clips, publicity materials</p> <p>Best workshop and innovation award</p> <p>Cost of PFKAFO is ¼ to 1/10 of custom made KAFO</p>	<p>supplier to overcome the problems.</p> <p>The entire sector got lot of importance in media and public and this technology has been on all major Indian TV channels. All top of Indian Cricket Stars mostly pace bowlers came forward to promote this technology</p> <p>Technology was introduced to Government of India through participation in their programme, national seminar and training Institutes.</p> <p>Children do not have to go for surgery as they wear the orthoses most of the time in school and at home as there are no chances of developing secondary deformities, thus treatment cost has been reduced</p> <p>Total cost of the orthoses in compare to present market rate in India, came down to one fourth. Besides, cost factor, fitment time is less. Production of orthoses in MI alone has been increased by four folds.</p>	<p>Wider and aggressive promotional activities in India and other developing countries</p> <p>Technology got appreciated and won best award in both national seminar and exhibition</p> <p>Cost could be further reduced by going for injection moulding</p>	
<p>Purpose:</p> <p>To create a system for mass production of appropriate low cost orthoses for wider distribution, rapid fitting and product testing</p>	<p>OVI</p> <p>PFKAFO is one of the most popular technology in India</p>	<p>Progress:</p> <p>A complete alternate system of low cost orthoses (PFKAFO) has been developed for wider distribution and rapid fitting with the help of mass produced prefabricated components.</p> <p>MI, its partners are now fitting hundreds or thousands of people with disabilities at a fast pace. This technology is also suitable for mobile service which MI is doing on regular basis to offer the service at the doorstep.</p> <p>The greatest beneficiaries of this technology are people with disabilities especially children and women.</p>	<p>Recommendations/action</p> <p>MI now has a ready stock of hundreds of such PFKAFO components which could be supplied all over the country</p>	

