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Plastic Caliper¹ Improves Accessibility for Disabled Children in Ethiopia

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The daily struggle with accessibility for Ethiopian children with disabilities seems obvious as we follow Fikadu Neguse, a seventeen-year-old boy with polio, into the sprawling slum of Merkato. He slowly negotiates the cobbled lanes, using crutches and his new plastic orthoses made from prefabricated components. The calipers have changed his life in significant ways. He and his mother shared the experience with us.

Fikadu fell ill with polio at the age of four. His mother said his arms and legs became weak and paralyzed. She took him to church for holy waters and but eventually she learnt from one of her neighbours that it might be polio. For years, he crawled to move around and his legs became bent and twisted. Most families in Ethiopia, including Fikadu's, either cannot afford to buy the braces that would allow their child to walk or are not aware that the technology exists. Even with the metal calipers, some places such as the Ethiopian Orthodox Church that Fikadu attends are off limits to one who cannot remove his shoes.

At age eleven Fikadu underwent surgery to correct his leg contractures, and was fitted with conventional metal calipers with heavy boots. His mother was full of hope then, at last her son could be walking. After 8 months of medical treatment and physiotherapy, he was able to use these braces and crutches to walk on his own. By this time, he had lost years of schooling, and the calipers helped to get him back into the classroom. Despite this benefit, many problems remained for Fikadu.

“Those calipers were huge and heavy, they did not support him fully, his buttocks and hips were painful and there were sores where it pinched,” remembers his mother.

Many adults and children with polio and other neuromuscular diseases living in developing countries like Ethiopia are forced to use this outdated technology due to money constraints and a low availability of custom-fit plastic braces.

Mobility India (MI), a Bangalore-based non-government organization (NGO), became aware of this issue through its work in rural India. Poor families struggle to take several days off work for the fitting of a custom-made plastic caliper. These lost wages, combined with the high cost of both travel to the center and the caliper itself, make plastic KAFO (knee ankle foot orthoses) alternatives unreachable for most.

MI teamed up with London based Disability and Development Partners (DDP), to research and develop a process where plastic orthotic components could be pre-fabricated and made available at low cost and be fitted quickly. Through 3 years of research, development, and field-testing, they created the plastic Pre-Fabricated Knee Ankle Foot Orthosis (PFKAFO) system. The plastic shells and accessories required to assemble a complete orthosis are produced

¹ Caliper/s and orthosis/orthoses and braces are used interchangeably throughout this article

in bulk, and come in ten standardized sizes that could be used for between 40 – 65% of people with lower limb paralysis.

A trained orthopedic technician must fit the caliper, but the entire process can be completed in one day. The components, which require standard workshop equipment to assemble, can be brought to rural areas by a mobile workshop. Thanks to PFKAFO technology, families no longer have to travel long distances and pay huge sums to get their loved one a plastic caliper that fully supports the leg, is comfortable to wear and can be worn with any kind of footwear or without shoes.

PFKAFO components are not perfect, but thousands of children and adults in India are wearing calipers made from these every day. After this success, MI and DDP decided it was time to take this technology to other developing countries, which led to the September 2005 PFKAFO Trials in Addis Ababa, Ethiopia where Fikadu was fitted with his new brace.

When asked about the difference between Fikadu's old braces and the new calipers, he says "I find them so easy to take on and off and to sit with my knees bent because the knee joint is easy to operate. The other ones took all my strength and I could not unlock it. Of course with these I can wear any type of shoes" and his mother adds, "The plastic calipers he wears now are so light and there is no pinching. He can walk more freely."

It remains uncertain whether Ethiopia will embrace PFKAFO technology as another option for people requiring lower limb orthotics, but the feelings of children like Fikadu are clear. They want and need these calipers for a more comfortable and free life and one that could safeguard them from developing secondary disabilities.



"I am surprised with these PFKAFOs. The biggest difference for me is that for the first time I could enter the church," Fikadu explained. "I took off my shoes, put socks over the caliper foot piece and walked in 'barefoot'. I could not do this with the metal caliper and boot. I was so happy".