

**Podoconiosis in the Dembidollo and Nekemte area,
West-Ethiopia 2007**

Report on the visit in March-April 2007

**Adri van Mastrigt-Valstar, general practitioner, Quintus van Mastrigt, general
practitioner, Nina Janssen-Fedoroff, photographer**



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Introduction

In March 2005, on request of the health workers of the 9 mission health clinics in the Dembidollo and Nekemte area, we visited this region for the first time. At that time we did a survey to get a better understanding of the elephantiasis which the health workers mentioned as a big health problem in the area. The conclusion of the 2005 report was that the cause of most elephantiasis in this area is probably podoconiosis¹. Further investigation and contact with Dr. Kager, Professor Tropical Medicine, University of Amsterdam, dermatologists in the Netherlands and others revealed that the altitude of the region and the clinical features make podoconiosis the certain cause for the elephantiasis which many people in this region suffer from.

Podoconiosis, or endemic non-filarial elephantiasis, is a geochemical disease occurring in individuals exposed to red clay soil derived from alkaline volcanic rock. Silica particles, absorbed through the skin of the foot, induce an inflammatory response in the lymphatic vessels, leading to fibrosis and obstruction of the vessel lumen. This leads initially to oedema of the foot and the lower leg, which progresses to elephantiasis: gross lymph oedema with mossy and nodular changes of the skin.



Podoconiosis

This paper describes the activities performed during our Ethiopia visit in March/April 2007. We visited Dr. Gail Davey, epidemiologist, Department of Community Health, Addis Ababa University. Together with her we travelled to Sodo, Wolaitta Zone, Southern Ethiopia and visited the Mossy Foot Prevention and Treatment Association. Afterwards we went to Western Ethiopia for about 2 weeks. We visited the 9 mission health clinics to share our experiences and knowledge with health workers and patients, to examine patients and to discuss questions for further research. On our way back to Addis we visited the Gimby hospital.

¹ Van Mastrigt-Valstar, A., van Mastrigt, Q., Ney-Bruin, C., Janssen-Fedoroff, N. Report on elephantiasis in the Dembidollo and Nekemte area, West-Wollega. Stichting Wollega-Ethiopie, April 2005.

Visit to Dr.Gail Davey

Dr. Gail Davey is epidemiologist and Associate Professor at Addis Ababa University. The last few years she is doing research on podoconiosis. She published papers on genetic factors¹ and economic costs² involved in the disease. She provided us now with a very recent “Comment”, published in the Lancet³. Currently she is designing a staging system for podoconiosis and she gave us a draft version. In her system she mentions 5 stages: 1. Swelling reversible overnight. 2. Below-knee swelling that is irreversible overnight; knobs/bumps present below ankle only. 3. As in 2 with knobs/bumps present above ankle. 4. Above-knee swelling that is irreversible overnight; knobs/bumps present at any location. 5. Bone changes; swelling at any place in foot or leg.

Dr. Gail Davey accompanied us on our visit to the Mossy Foot Prevention and Treatment Association in Wolaitta, her main research region.

Visit to Mossy Foot Prevention and Treatment Association

The Mossy Foot Prevention and Treatment Association is a local non-government organization based in Sodo, Wolaitta. This organization has been working with podoconiosis patients since 1998. Mr Meskele Ashine, the energetic executive director gave us an overview of the activities: outreach clinics, shoemaking, vocational training and surgical treatment.

The 15 outreach clinics are supervised by “health agents”, all podoconiosis patients, trained to educate and treat other patients. After 1 week full time education and a clinical training they are responsible for their own clinic. Later on they attend 4 days workshops on specific subjects. A health agent and a mental coach manage a clinic with 500 patients; each clinic has 4 groups of patients who each attend a monthly session. The health agents are full time employed by the Association for weekly clinics, home visits and case finding by house to house visits. Their monthly salary is 300 Birr (270 Euro).

In their clinic they start with giving education, orally and illustrated by a simple poster. After that they check all patients individually and provide them with soap, bleach and Whitfield ointment. They bandage indicated patients, especially the patients with the “waterbag” legs: large, quite soft oedema. They also dispense plastic shoes and socks for non-affected children of affected families and orthopaedic shoes and socks for patients who do not fit into normal shoes.

The orthopaedic shoes are extra wide shoes, handmade from leather by specially trained patients. In the shoemaking unit 7 male patients are making 250 pairs of shoes per month. The shoemakers earn a salary of 400-450 Birr per month. The price of the shoes is 90-150 Birr per pair dependant on size; they are sold to the patients for 0-15 Birr per pair.

Surgical treatment is provided for selected patients by Dr.Fikadu Ayele in the Otona hospital in Sodo. In the last year he did nodulectomy on 28 patients. He excises the big nodules on the back of the feet and covers it with a skin graft. For postoperative care the patients stay 2-3 months in a part of the hospital, built by the Mossy Foot

Association. The aim of the operation is making the patients feet to fit into shoes. Unfortunately there is not yet any follow up. A few years ago another surgeon in the same hospital did extensive radical operations by stripping the whole lower leg and foot; the result seemed very hopeful but follow up after 4 years revealed that the legs were swollen again, very painful and wet from leaking lymph fluid. It is Dr. Fikadu's opinion that this extensive surgery is obsolete.

Vocational training of young podoconiosis patients is another program of the Association. Young men get a 2 months training to become a carpenter and young girls a 1 month course to become a hairdresser. Both groups are provided with a toolkit to start their own business.

We were impressed by the very well organized and intensive program the Association is running, which results not only in improvement of the medical situation of the feet of the patients but also in a better life for many of them.

Health clinics in Wollega West-Ethiopia

The nine health clinics we visited are almost the same as during our visit in 2005. Five of them are located in the villages Addo, Danka, Sakko, Karro and Alequ, around Dembidollo, the capital of West Wollega, about 650 km west of Addis Ababa. Four are in and around Nekemte, the capital of East Wollega, about 330 km west of Addis. One clinic is in Nekemte itself, the others in the villages Aria Jawi, Horda Ambalta (same region as 2005 Arjo) and Konchi. The areas around Dembidollo and Nekemte are highlands (altitude respectively 1700m and almost 2100m) with red volcanic soil.

Wollega is an isolated area and podoconiosis is still a quite unknown disease. The nurses and health workers have a lot of other diseases and problems to deal with. On their request we function as a trait-d'union between these health workers and the rest of the world to get a better understanding of prevention, care and cure of this disease and to improve the situation of podoconiosis patients.

In each clinic the nurses invited podoconiosis patients during our visit. Some invited only the worst cases, others invited all their elephantiasis patients. As a result we saw just a few patients in some clinics but in others we were confronted with almost 900 patients. We started in all clinics with a short education to all the patients about the disease; then we examined as many patients as possible individually; afterwards we discussed with the health workers about their and our experience.

We explained to the patients that since our last visit 2 years ago we know a little bit more about the "disease of the leg" (the way they call it), that the disease is called podoconiosis and that the disease is caused by the volcanic soil they live on. We also told them that some families are more at risk to get the disease than others are[#]. We informed them about prevention by cleaning feet and wearing shoes. This message is not only important for themselves but especially for their children even

[#] in one clinic the health workers made an objection against our remarks on a hereditary factor: they thought this might stigmatize the patients and whole families even more

when they are not (yet) affected. We also paid some attention to elevating and exercising.



Results of medication, washing of feet, skin caring and wearing shoes

In total we examined 812 patients. We examined the feet and legs for swelling, the condition of the skin and infections. We saw patients who attended the clinics regularly since years and we also saw new ones. We met proud patients showing their very clean and improved feet and we met shy patients without shoes with dirty feet. We examined young patients (68 patients were under 20) and old patients. We saw the different stages of the disease, from slight swelling which disappears overnight to gross oedema with nodules and mossy changes of the skin until just above the ankle.

Since some clinics invited only their worst cases and others did not select their patients, it was impossible to compare the different clinics and their treatment. Our main impressions and some remarkable findings:

- many patients show good improvement: less swelling, soft smooth skins, even when scars from previous skin abnormalities are still visible. Not smelling anymore is also a very positive experience for patients
- almost always both legs are affected, sometimes one leg worse than the other
- big nodules seem to get smaller with intensive treatment, but they do not always disappear completely
- big nodules are a big problem for fitting into shoes, even into specially made shoes
- we never observed oedema or other abnormalities above the knee (Dr Daveys stage 4).
- ca 80% of the patients have a fungus infection between their toes, even very clean feet still show interdigital fungus
- we observed the largest oedema's on young women, often without any skin changes
- we saw shortening of the toes or almost the aspect of amputation of the toes. This seems to be caused by hyperflexion of toes and sticking together. Without X-ray it is impossible to be sure if there are any bony changes (Dr Daveys stage 5)

- mossy changes are almost always very dry. They exist mostly with people who do not wear shoes. They are a big risk for getting wounds and infections.

In the discussion with the health workers we experienced that the nine clinics do not have a uniform treatment program. Most of the clinics have a specific day for podoconiosis patients, on which they give group education, washing the feet and give group treatment.

All clinics advise a daily cleaning/soaking with water and soap. For soaking the clinics use different solutions: some use potassiumpermanganate (not everywhere available), others use special flowers and other clinics use bleach (barakina; this is cheap and everywhere available). Treatment of the skin with emollients also differs per clinic: some use Whitfield ointment, others Neem oil (local tree leaves) and some Zinc oxide. Also antibiotic treatment differs: some clinics give a monthly dose of benzathinebenzylpenicillin for all patients with wetness, smelling or pain. Others give benzathinebenzylpenicillin on strict indication: fever or warm leg. One clinic prescribes only oral antibiotics (Bactrim) on strict indication.

We found it confusing that still some clinics do tests with which they “diagnose” lymphatic filariasis. They use 2 tests: a provocation test with diethylcarbamazine (DEC) and a skin test. Both tests are diagnosing onchocerciasis (*O.volvulus*) and not lymphatic filariasis (*Wuchereria Bancrofti*).

A short explanation to settle this business^{4 5}: Onchocerciasis and lymphatic filariasis are both diseases caused by filariae (nematodes or roundworms).

Onchocerciasis is spread by a blackfly. The clinical signs are in the skin and in the eyes: itching, depigmentation (leopard skin) and keratitis, causing blindness on the long run. Diagnosis is made by showing microfilariae in a piece of skin under the microscope or by the Mazzotti test: giving a single oral dose of 50 microgram DEC, which causes intense itching after 20-90 minutes in oncho-infected patients. Onchocerciasis is widespread in the Wollega area and is treated by a mass treatment program with Ivermectin, annually provided by the government. Ivermectin does not kill the adult worms, just kills the microfilaria, produced by the worm. So after treatment levels of microfilariae can reaccumulate over many months and treatment has to be repeated.

Lymphatic filariasis is spread by a mosquito and does not exist on altitudes as in the Dembidollo and Nekemte area. (This might change in the future with the climate changes[#]) Clinical signs are lymphoedema of the whole 4 limbs, genitalia and breasts (and not just the lower legs as in podoconiosis) Diagnosis is made by blood tests only and not by a skin test.

Those clinics in the Dembidollo and Nekemte area which do the skin test and the provocation test do not diagnose lymphatic filariasis but onchocerciasis, a well known widespread disease in the area, treated with mass treatment with Ivermectin.

Some clinics provide patients with shoes, mostly canvas shoes. One clinic (Nekemte) employs a shoemaker, trained in Wolaitta, to make special big shoes.

For many patients the lack of accessibility and availability of clean water in the communities is a big problem. Another economic problem is the costs of treatment and shoes. Patients have to pay (a small amount of) money but often they cannot afford to pay even a few birr. Most podoconiosis patients are very poor.

[#] personal information from Emanu Getu Degaga, entomologist, Associate Professor Addis Ababa University

We observed an improvement of the overall condition of the legs in the different clinics compared to our survey in 2005. It is difficult to relate improvement to specific treatment. We did not see better results with permanganate than with bleach for instance. Also the patients of the clinics which use a liberal antibiotic regimen do not in general show better feet and legs than the patients of the clinics with a strict antibiotic regimen.



Washing of feet with permanganate or bleach

Dermatologists in the Netherlands informed us that bandaging might contribute to improvement. We took bandages and elastic stockings with us and gave a short instruction how to use these. Some clinics will try the bandaging, especially for young patients with starting lymphoedema. In the future we will see if this treatment is useful and tolerated by patients in these areas. If useful, we have to find out where bandages are available in Ethiopia. (In Wolaitta they use bandaging in postoperative patients)

In the future we will try if lymphedrainage might be another therapeutic option⁶.

As far as we are informed surgical treatment, unless for amputation, is not provided in Wollega.

Visit to Gimby hospital

Gimby is a town between Dembidollo and Nekemte, a regional centre at an altitude of 2000m. In the Gimby Adventist Hospital we met Dr Arega Fekadu. Also in this hospital they see many patients with elephantiasis. They do skin tests and “diagnose” lymphatic filariasis. Since a few months Dr Arega is doing extensive radical operations on elephantiasis patients. He operated 8 patients and is very enthusiast about the result. We informed him about the bad long-term results in Wolaitta.

Conclusions

Podoconiosis is a disease, which is strongly related to poverty, bare foot walking and lack of water. However education, cleaning of the feet, wearing shoes and intensive treatment can improve the situation of the patients, make a lot of difference of their life and prevent their children.

In Wolaitta there is a lot of experience with a program of health education, general treatment and shoe wear provision by trained patients. The recently started limited surgical treatment seems successful but needs long term follow-up. The medical and social experiences of Wolaitta could be very useful for other health clinics.

Compared to 2005, the podoconiosis patients show improvement of the condition of their feet and legs in the health clinics in Wollega. Fungal infections are abundant despite intensive cleaning. The clinics do not have a uniform treatment. Although we did not find one best treatment schedule it is clear that a good antiseptic to get rid of infections and a good emollient to keep the skin in optimal condition are necessary. Liberal antibiotic treatment does not seem to give a better result than antibiotic treatment on strict indication. Big nodules are a problem for fitting into (specially made) shoes, whereas wearing shoes is vital for these patients. But also best treatment and shoes are not affordable for all patients.

Surgical treatment differs widely in the country and getting a good follow up seems to be very difficult.

Recommendations

- Education is the first step to prevent the disease and to inform patients. Health education on podoconiosis could be extended and given by selected and trained patients. A poster as illustration will be helpful. Also education about podoconiosis for students at schools and other groups might help for prevention and for earlier case finding
- Providing a good antiseptic to get rid of the fungal infections is necessary. Bleach (Barakina) is cheap and widely available. Two caps (10 ml) in 5 litre is the right concentration; with daily use a bottle of 300 ml will last for 4 weeks. Potassium permanganate is not always available, more expensive, seems to be more toxic and is more difficult in making the right concentration. Also Whitfield ointment is not always available and is more expensive than bleach. More attention to interdigital cleaning is recommended.
- Providing a good emollient for all patients is necessary. Locally made Neem oil is a good and cheap alternative.
- Antibiotic treatment should be administered on strict indication: fever and hot, swollen leg.
- Exercise treatment and daily life advices like elevation of legs during the night are recommended. Exercises and daily life advices can be given by trained health educators.
- Further research on treatment of nodules is necessary.

- Making health care and shoe wear affordable for all patients is a wish for the future.
- Building a regional and national network and contact between all health workers, nurses and doctors who are involved in the care for podocorniosis patients is vital for a better outcome. We can learn from each other's mistakes and stimulate each other to invent new approaches. To make a start a list of email addresses is attached.

Thanks

Thanks to all podocorniosis patients who came to the clinics to show us their feet. Sometimes they came from far and walked for so many hours, sometimes they also had to wait for so many hours.

Thanks to all health workers and nurses in the clinics who made it possible for us to meet so many patients.

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Email addresses

Addis Ababa

Dr.Gail Davey, Addis Ababa University
Mr.Emana Getu Degaga, entomologist, Addis Ababa University

nerurkar@ethionet.et
eketudegaga@yahoo.com

Sodo/Wolaitta

Mr.Meskele Ashine, Mossy Foot Prevention and Treatment Ass.
Dr.Fikadu Ayele, Otona Hospital

ccc.kid@ethionet.et
famyafitgy@yahoo.com

Wollega

Danka, Sr.Evelyn
Sakko, Sr.Alphonsa
Alequ, Sr.Hanna
Nekemte, Sr.Celine
Horda Ambalta, Srs.Laura and Neves

dcdanka@ethionet.et
hm-sakko@ethionet.et
dcdanka@ethionet.et
nekemtefcc@yahoo.co.in
lauracombona@yahoo.it

Gimby

Sr.Matilde
Dr.Ruth Lawson, Adventist Hospital
Dr.Arega Fekadu, Adventist Hospital

matilde_rvr@yahoo.com
ruth.lawson@nhs.et
draregafekadu@yahoo.com

Netherlands

Dr.Quintus van Mastrigt
Dr.Adri van Mastrigt-Valstar
Nina Janssen-Fedoroff
Prof.dr.Piet Kager, Tropical Medicine, University of Amsterdam

avalstar@knmg.nl
avalstar@knmg.nl
nina@panagenturen.nl
p.a.kager@amc.uva.nl