Non-venereal treponematoses

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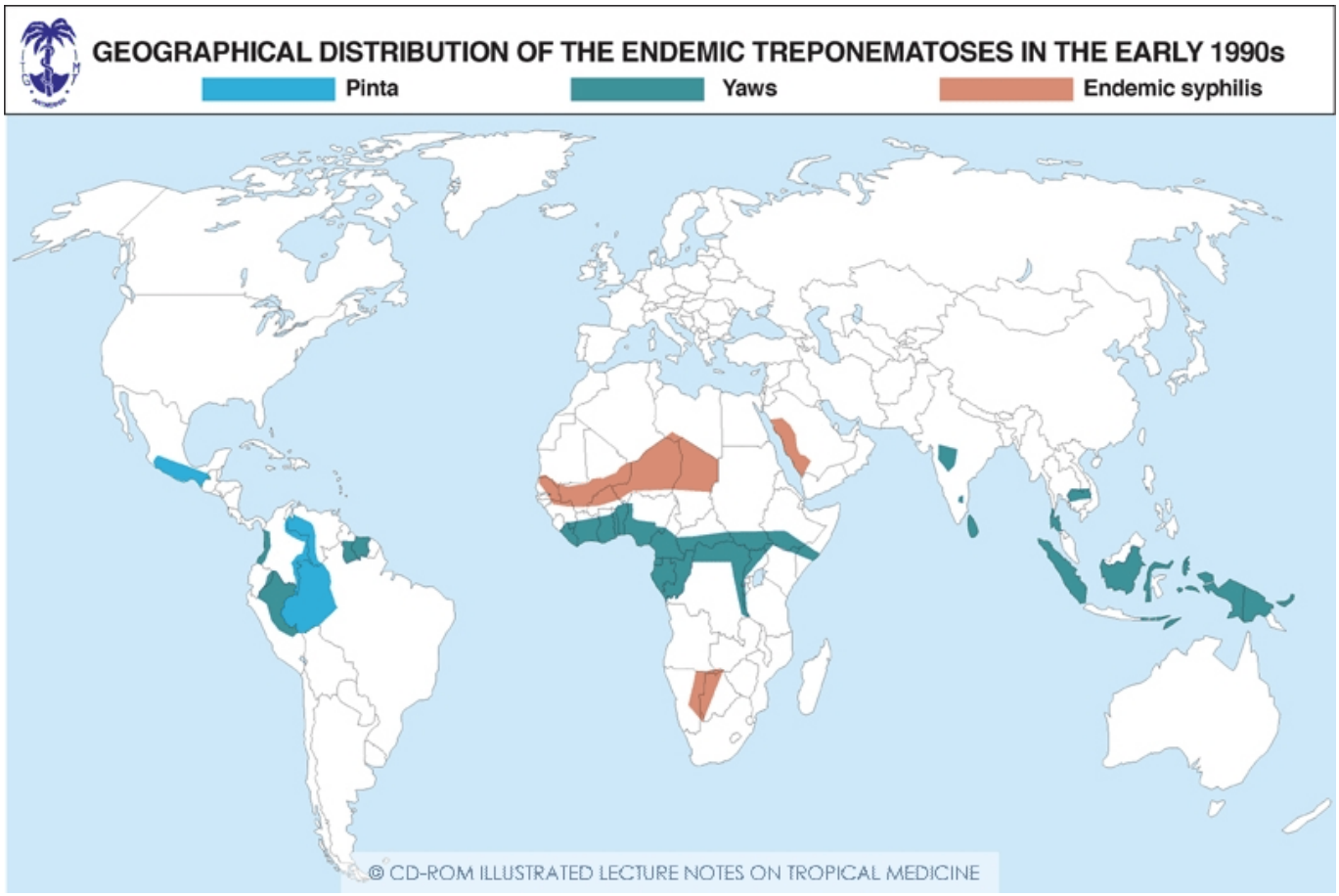
Treponematoses are diseases caused by treponemes. These are bacteria with a spiral structure ("trepo" = turn; "nema" = thread). They belong to the *Spirochaetaceae*. They cause 4 different chronic exclusively human diseases. There is **no animal reservoir**. The various treponemes cannot be cultured in vitro (*Treponema pallidum* can be cultured with some difficulty in tissue culture and in rabbit testicles). Morphologically **they cannot be distinguished one from another** and all give positive results on so called syphilis serology. They are all sensitive to penicillin. Prevention varies.



Geographical distribution of non-venereal treponematoses.

Bejel or Njovera or Treponarid

Bejel is caused by ***Treponema endemicum*** (*Treponema pallidum endemicum*). The disease occurs

(occurred) in foci in sub-Saharan Africa, in the Middle East, central Australia and in Asia, in temperate to warm dry climates (e.g. Sahel area, Zimbabwe, Botswana). The disease formerly also occurred in Bosnia. Between 1950 and 1960 there were large-scale campaigns to control the disease in the Sahel countries. At present the disease has become rare.

Infection mainly results in **skin and skeletal abnormalities**. Transmission is not via sexual intercourse but through contact. The incubation time is unknown. As a rule, non-venereal or endemic syphilis occurs in childhood. The **oral mucosae are the most important source of infection**. Children are mainly infected by objects they use such as contaminated beakers (bacteria entering through the mouth). In this way they probably acquire immunity against *T. pallidum* before puberty and are protected against later venereal syphilis.

There is an **early stage** which lasts some 5 years. This is characterised by skin lesions and oral mucosal lesions which occur intermittently. **Osteitis and periostitis** can occur. In rare cases there are **delayed lesions (gummata)**. Gangosa is characterized by destruction of the nose, lip and palate and can lead to severe mutilation. Treatment consists of a single IM administration of 1.2 or 2.4 million units of long-acting benzathine penicillin. A single dose of azithromycin can also be used for treatment but some guidelines prefer to safeguard azithromycin as reserve antibiotic. Tetracyclines can be used as an alternative. Plastic reconstructive surgery is often needed to repair mutilations.

Framboesia or Yaws or Pian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Framboesia, yaws, pian. Infection with Treponema pallidum pertenue. Copyright ITM, photo by Dr Jef Van den Ende.


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Framboesia, yaws, pian. Infection with Treponema pallidum pertenue, resulting in plantar hyperkeratosis with painful cracks and fissures. Copyright ITM, photo by Dr Jef Van den Ende.

Yaws is caused by ***Treponema pertenue*** or *Treponema pallidum pertenue*. The transmission of yaws in man through inoculation was demonstrated by Paulet in 1848 and by Charlouis in 1881, predating the discovery of *T. pertenue* by Castellani in two Ceylonese patients with the disease (called "parangi" there).

This treponematosis is transmitted from person to person via **direct skin and mucous membrane contact** (small scrapes). It is a disease of poor isolated rural communities in warm, humid, tropical areas of Africa, Central and South America, and some islands in Southeast Asia. There is hardly any congenital transmission. Framboesia has currently become rare and has been eliminated in some areas (e.g. in Esmeraldas, Ecuador) but may be re-emerging in some areas. This is explained by the deterioration in clinical medical care in certain areas (it is easy to diagnose and the treatment is cheap and simple) and the lack of large-scale treatment campaigns. *T. pertenue* can infect baboons, chimpanzees and some other monkeys, but the importance of this is not clear. It is unlikely that an animal reservoir plays an important epidemiological role as far as can be judged at this time.

Clinical Aspects

The **skin and skeleton** are affected, deep organs are always spared. The disease is characterised by **wart-like skin lesions with the appearance of strawberries** (hence the name; yaw = strawberry). The skin lesions return periodically.

The primary lesion is extragenital. It may consist of one warty lesion but sometimes there is an initial **parent lesion with various satellite lesions**. In most cases the lymph nodes are swollen. If the hypertrophic, papillomatous epidermis is removed an exudate with a crust forms. There is no deep ulceration. These early lesions heal without leaving scars. After healing some residual skin discoloration may remain.

A few weeks to months after the primary lesion, more scattered secondary macular or papillomatous lesions occur. The early skin lesions which contain a great number of treponemes, tend to be multiple and moist. They occur in flare-ups which last weeks or months in each case. Without treatment this can last 3 to 5 years. When there is a flare-up, there can be general malaise together with joint pain and fever. The skin lesions may persist for 3-6 months. On the palms of the hand and the soles of the feet the skin can thicken, become **hyperkeratotic** and itchy and painful fissures appear. These result

in the characteristic gait, the so-called **“crab gait”.** A severe infection with *Tunga penetrans* (sand fleas) can sometimes produce a similar picture, but on closer inspection the difference is clear. Sometimes there is involvement of the skeleton. Chronic inflammation of the bones of the fingers (dactylitis) should be distinguished from the more acute dactylitis seen in sickle cell anaemia. Since the general availability of penicillin occasionally mild forms of yaws are seen with only one or just a few small lesions, a few papules or limited hyperkeratosis. It is not known whether the pathogen has a reduced sensitivity to penicillin.

Late-onset framboesia occurs in 10% of patients (after > 5 years). Characteristic of this condition are **sporadic gummata in the skin**; deep crater-like ulcers which later heal with the formation of scars covered by a thin skin. Treponemes are very rare here and the lesions are therefore not particularly infectious. Contracture of the affected limb may occur. Joints may stiffen and chronic osteitis and periostitis can lead to bent legs (sabre tibiae).

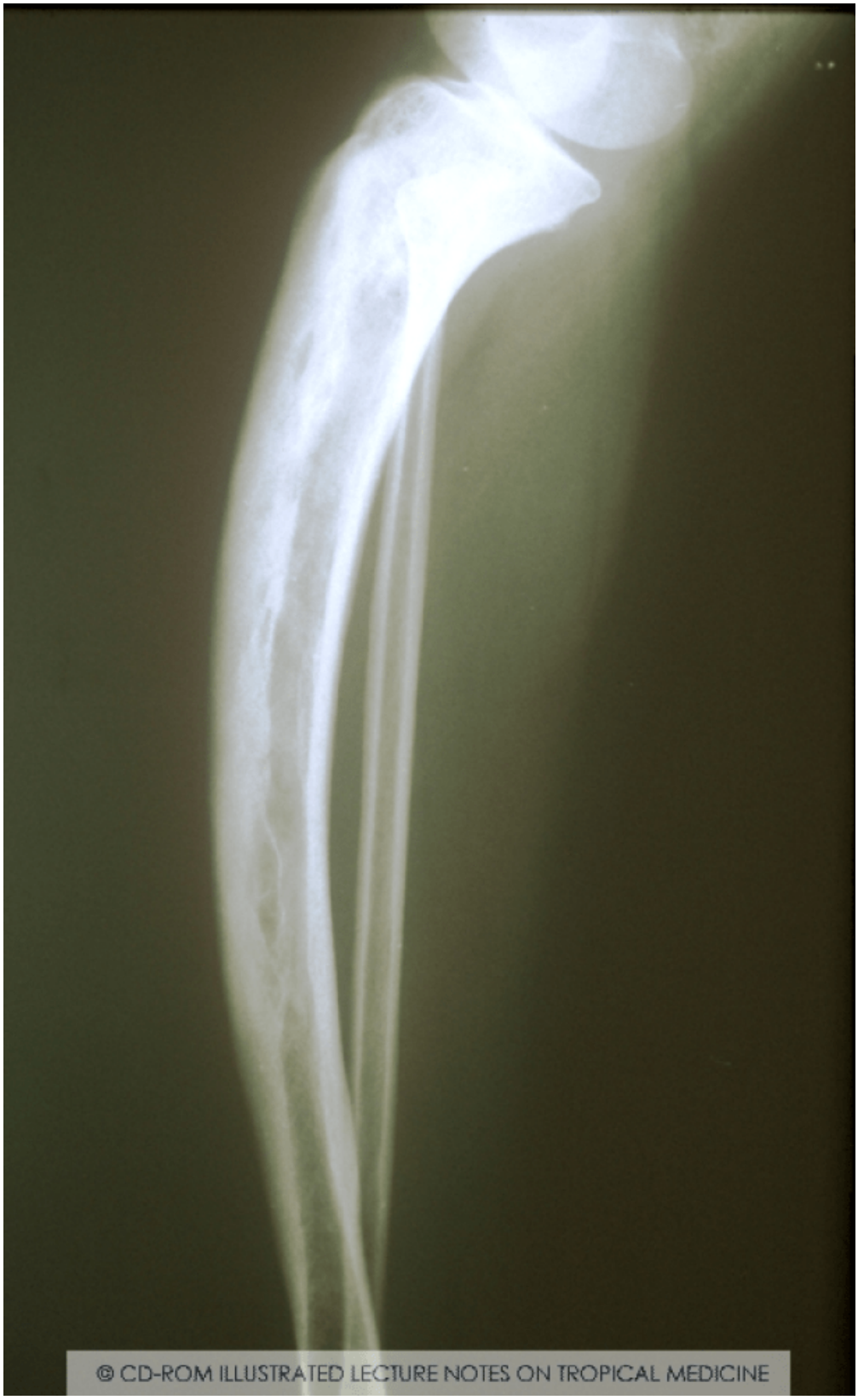
A number of secondary lesions occur in framboesia:

•**Nodules**: mainly around joints. Hard nodules which are loose from the skin and the deep tissue on the extensor side of elbows, wrists also on trochanters, ankles and sacrum. The aetiology is unclear and a differential diagnosis has to be made with onchocerciasis.

•**Gangosa**: this is rapid tissue loss from the nose, palate and upper lip, caused by a gumma in this area. To be differentiated from espundia (mucocutaneous leishmaniasis), deep mycosis (e.g. blastomycosis), leprosy and noma (= cancrum oris associated with among other things, malnutrition caused by infection with *Borrelia sp*. and fusobacteria).

•**Goundou**: swelling of the nose and upper jaw bones due to inflammation of the bones of the nose (osteitis). The rare fungal infection rhinoentomophthoromycosis can sometimes be confused with this.

•**Gumma**: a subcutaneous gumma can manifest itself as a cold abscess.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Framboesia, yaws, pian. Infection with Treponema pallidum pertenue. Deformed tibia, the so-called sabre tibia.


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Melorheostosis can resemble Treponema pertenue sequellae, such as sabre tibiae. The radiological lesions often look like dripping candle wax. Copyright ITM


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Framboesia, yaws, pian. Infection with Treponema pallidum pertenue. Notice the deformed tibiae, the so-called sabre tibiae. Copyright ITM, photo by Dr Jef Van den Ende


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Framboesia, infection with Treponema pertenue. The name gangosa refers to the ulcerative destruction of the centre of the face. If a child survives noma, similar lesions can be found in adults.

Treatment

In patients over 10 years of age, a **single IM injection of 2.4 million units of benzathine penicillin** or a **single dose of azithromycin 30 mg/kg (max 2 gr)** is sufficient. Half the dose of penicillin should be used in younger children. In the early stages this produces fairly spectacular results. All individuals who have been in contact with the patient should also be treated. Doxycycline can be used for one week as an alternative. Erythromycin is less active. Azithromycin has been successfully used in mass treatment programs to enable yaws elimination. In certain areas the eradication of framboesia has been followed by an increase in venereal syphilis.

After successful treatment titers of nontreponemal serological tests become negative within less than 2 years.

Pinta


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Pinta, depigmented skin lesions. Infection with Treponema carateum. Photo Cochabamba, Bolivia

Pinta is caused by *Treponema carateum*. This treponematosis is limited to a few foci in Central America, Colombia and southern Mexico. Cases of pinta are becoming less and less frequent. Only the skin is affected. Transmission is through contact. The primary lesion is a scaling papule which is often itchy. This appears within ten days after exposure. The papule increases in size over the following 2 to 3 months and forms a flat, scaly plaque. There is no latency period, unlike other treponematoses. A few months to more than one year later, a mild itchy maculopapular rash develops. The spots are distributed randomly over the whole of the body. They have abnormal changing pigmentation: initially blue to purplish then brown. They still contain treponemes. Later the lesions become atrophic and fade. After treatment with penicillin the lesions remain discoloured. The main problem is cosmetic, to be distinguished from other causes of hypopigmentation such as vitiligo and leprosy. There are no ulcers and no bone lesions. Pinta does not protect against the other treponematoses.

Summary

	Syphilis	**Bejel**	**Yaws**	**Pinta**
Point of entry	Genitalia	mouth	skin	skin
Congenital	yes	no	no	no
Bone lesions	sometimes	sometimes	often	never
Visceral lesions	yes	no	no	no

LAST UPDATED BY ADMIN ON JULY 14TH, 2022