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# Lyme Arthritis

Version of 2016

## 1. WHAT IS LYME ARTHRITIS

### 1.1 What is it?

Lyme arthritis is one of the diseases caused by the bacterium Borrelia burgdorferi (Lyme borreliosis) which is transmitted by the bite of hard ticks, including Ixodes ricinus.
While the skin, the central nervous system, the heart, the eye and other organs may be the target of infection with Borrelia burgdorferi, joints are the exclusive target in most cases of Lyme arthritis. However, there may be a history of skin involvement in the form of erythema migrans, an expanding red skin rash at the site of the tick bite.
In rare instances, untreated cases of Lyme arthritis may progress to central nervous system involvement.

### 1.2 How common is it?

Only a minority of children with arthritis have Lyme arthritis. However, Lyme arthritis is probably the most frequent arthritis occurring after bacterial infection in children and adolescents in Europe. It rarely occurs before the age of 4 years and is therefore primarily a disease of school children.
It occurs in all areas of Europe but is prevalent in Middle Europe and southern Scandinavia around the Baltic Sea. Although transmission depends on the bite of infected ticks, which are active from April to October (depending on environmental temperature and humidity), Lyme arthritis may start at any time during the year due to the long and variable time between the infecting tick bite and the onset of joint swelling.

## 1.3 What are the causes of the disease?

The cause of the disease is the bacterium Borrelia burgdorferi, which is transmitted via the bite of the tick Ixodes ricinus. Most ticks are not infected and hence most tick-bites do not result in infection and most infections, if apparent as erythema migrans, do not progress to later stages of the disease including Lyme arthritis.
This is the case especially if early stages, including erythema migrans, have been treated with antibiotics. Thus, although Lyme borreliosis, in the form of erythema migrans, may occur in up to 1 in 1000 children each year, the occurrence of Lyme arthritis, the late manifestation of the disease, is a rare event.

## 1.4 Is it inherited?

Lyme arthritis is an infectious disease and is not inherited. In addition, Lyme arthritis resistant to antibiotic treatment has been associated with certain genetic markers but the precise mechanisms of this predisposition are not known.

## 1.5 Why does my child have this disease? Can it be prevented?

In European regions where ticks are found, it is difficult to prevent children from acquiring a tick. However, most of the time the causative organism Borrelia burgdorferi is not transmitted immediately after the tick bite, but only several hours and up to one day later, when the bacterium has reached the salivary glands of the tick and is excreted with saliva into the host (i.e. the human body). Ticks attach to their hosts for 3 to 5 days, feeding on the host’s blood. If children are screened every evening in the summer for attached ticks and if these ticks are removed immediately, transmission of Borrelia burgdorferi is very unlikely. Preventive treatment with antibiotics after a tick bite is not recommended.
However, when the early manifestation of erythema migrans occurs, it should be treated by antibiotics. This treatment will stop further proliferation of the bacterium and prevent Lyme arthritis. In the USA, a vaccine against a single strain of Borrelia burgdoferi had been developed, but it was withdrawn from the market for economic reasons.

This vaccine is not useful in Europe due to strain variations.

### 1.6 Is it contagious?

Although it is an infectious disease, it is not contagious (i.e. it cannot spread from one human to another), since the bacterium must be transported by the tick.

### 1.7 What are the main symptoms?

The main symptoms of Lyme arthritis are joint swelling with effusion and limitation of movement in the affected joint(s). Large swelling(s) are often accompanied by little or no joint pain. The most frequently affected joint is the knee, although other large joints and even small joints may be affected. It is rare for the knee to be not involved at all: 2/3 of cases present as monoarthritis of the knee joint. More than 95% of cases take an oligoarticular (4 or fewer joints) course often with a knee joint as the only remaining inflamed joint after some time. Lyme arthritis occurs as episodic arthritis in 2/3 of the cases (i.e. arthritis disappears on its own after several days to a few weeks and, after an interval without any symptoms, arthritis returns in the same joints). The frequency and duration of episodes of joint inflammation usually decreases with time but in some cases the inflammation may increase and arthritis may ultimately become chronic. There are also rare cases with long-lasting arthritis from the beginning (duration of arthritis for 3 months or longer).

### 1.8 Is the disease the same in every child?

No. The disease may be acute (i.e. there is a single episode of arthritis), episodic or chronic. The arthritis appears to be more acute in younger children and more chronic in adolescents.

### 1.9 Is the disease in children different from the disease in adults?

The disease in adults and children is similar. However, children may have a higher frequency of arthritis than adults. In contrast, the younger the child, the more rapid the course and the better the chance

of successful antibiotic treatment.

## 2. DIAGNOSIS AND THERAPY

### 2.1 How is it diagnosed?

Whenever there is newly appearing arthritis without a known cause, Lyme arthritis should be considered for differential diagnosis. The clinical suspicion is confirmed by laboratory investigation including blood tests and, in some instances, tests on synovial fluid (fluid from swollen joints).

In blood, antibodies against Borrelia burgdorferi are found by a test called Enzyme Immuno Assay. If there are IgM-antibodies to Borrelia burgdorferi found by Enzyme Immuno Assay, a confirmatory test called Immunoblot or Western blot must be performed.

If there is arthritis of unknown cause and if there are IgM-antibodies to Borrelia burgdorferi detected by Enzyme Immuno Assay and confirmed by Western blot, the diagnosis is Lyme arthritis. The diagnosis may be confirmed by analysis of synovial fluid, in which the gene of the bacterium Borrelia burgdorferi can be found using a technique called polymerase chain reaction. However, this laboratory test is less reliable than serology measuring antibodies. In particular, the test may fail to indicate infection in the presence of infection and it may indicate infection when there is none. Lyme arthritis should be diagnosed by the paediatrician or in a paediatric hospital. However, if antibiotic treatment fails, a specialist in paediatric rheumatology should be involved in the further management of the disease.

### 2.2 What is the importance of tests?

Apart from serological values, usually inflammatory markers and blood chemistry are carried out. In addition, other infectious causes of arthritis may be considered and tested using appropriate laboratory assays.

Once Lyme arthritis has been confirmed by laboratory values including enzyme immunoassay and immunoblot, it is not useful to repeat these tests since they do not indicate response to antibiotic treatment. In contrast, these tests may remain highly positive for years in spite of successful treatment.

## 2.3 Can it be treated/cured?

Since Lyme arthritis is an infectious bacterial disease, treatment is by administration of antibiotics. More than 80% of patients with Lyme arthritis are cured after one or two courses of treatment with antibiotics. In the remaining 10–20%, further antibiotic treatment usually does not cure the disease and anti-rheumatic treatment is necessary.

## 2.4 What are the treatments?

Lyme arthritis may be treated by oral antibiotics for 4 weeks or intravenous antibiotics for at least 2 weeks. If compliance is problematic with amoxicillin or with doxycycline (only to be given in children over 8 years of age), intravenous treatment with ceftriaxon (or with cefotaxime) may be more advantageous.

## 2.5 What are the side effects of drug therapy?

Side effects may occur including diarrhoea, with oral antibiotics, or allergic reactions. However, most side effects are rare and minor.

## 2.6 How long should treatment last?

After antibiotic treatment has been completed, it is recommended to wait 6 weeks before concluding that treatment might not have cured the disease in the presence of ongoing arthritis.
If this is the case, another antibiotic treatment may be administered. When there is still arthritis 6 weeks after the completion of the second antibiotic treatment, anti-rheumatic drugs should be commenced. Usually, non-steroidal anti-rheumatic drugs are prescribed and corticosteroids are injected into the affected joints, most often the knee joint.

## 2.7 What kind of periodic check-ups are necessary?

The only useful check-up is examination of the joints. The longer the period since the disappearance of arthritis, the less probable is a

relapse.

### 2.8 How long will the disease last?

More than 80% of cases disappear after one or two antibiotic treatments. In the remaining cases, arthritis will disappear over a course of months to years. Eventually, the disease will stop altogether.

### 2.9 What is the long-term evolution (prognosis) of the disease?

After treatment with antibiotics, in most cases the disease will go away without leaving any consequence. There are individual cases where definite joint damage has occurred, including limited range of motion and premature osteoarthritis.

### 2.10 Is it possible to recover completely?

Yes. More than 95% of cases will recover completely.

## 3. EVERYDAY LIFE

### 3.1 How might the disease affect the child and the family's daily life?

Due to pain and limitation of motion, the child may experience limitations in sport activities, for example not being able to run as fast as before. In most patients, the disease is mild and most problems are minor and transient.

### 3.2 What about school?

For a limited period of time, it may be necessary to stop participation in school sports; the student may be able to decide on her/his own in which activities she/he would like to take part.

### 3.3 What about sports?

The child/adolescent should decide by herself/himself on this matter. If

the child takes part in a regular planned programme in a sports club, it might be advantageous to diminish the requirements of this programme or to adapt the requirements to the patient’s wishes.

### 3.4 What about diet?

The diet should be balanced and contain adequate protein, calcium and vitamins for a growing child. Dietary changes do not affect the course of the disease.

### 3.5 Can climate influence the course of the disease?

Although ticks need a warm and humid climate, once the infection has reached the joints, the subsequent course of the disease is not influenced by climatic variations.

### 3.6 Can the child be vaccinated?

There are no restrictions concerning vaccinations. The success of vaccination is not affected by the disease or by antibiotic treatment and there are no additional side effects to be expected due to the presence of the disease or treatment. There is currently no vaccine against Lyme borreliosis.

### 3.7 What about sexual life, pregnancy, birth control?

There are no restrictions on sexual activity or pregnancy due to the disease.