

## ARTHROPATHIA DIABETICA

By

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Following the introduction of insulin treatment late diabetic complications were seen to an increasing degree in the form of neuropathies, retinopathies and nephropathies, but in addition to these, arthropathies have emerged during the last 10–15 years: the first collected data on the latter disease came in 1947 when *Bailey & Root* announced some cases.

These arthropathies are, however, very rare; in all 89 cases have been described in the world literature available to me, and up to the end of 1958, as far as I know, no Danish case had been published.

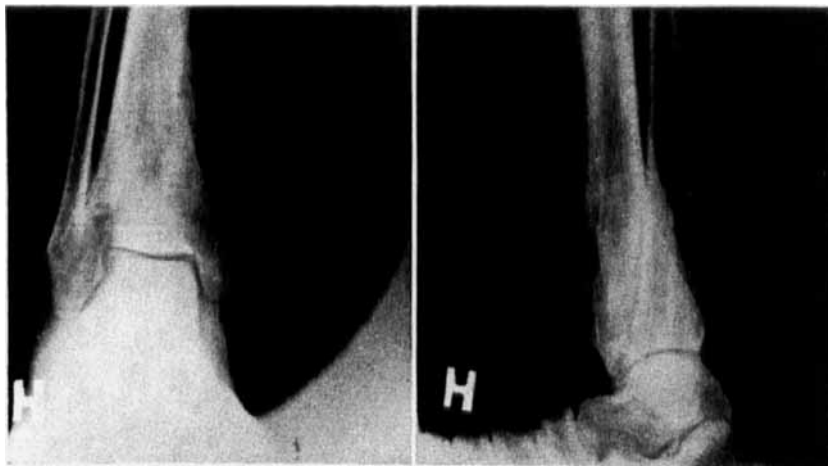
At the Orthopaedic Ambulatorium, Aalborg, we gave treatment to 4 cases in 1958, one of which had previously been treated at the Orthopaedic Hospital, Aarhus, and later continued to have treatment there: this case is consequently not included in this study, but the following account is given of the other 3.

*Male, P.O., aged 30 years. N. 25372.*

The patient has had diabetes from the age of 10, but there is no other case of diabetes in the family. A brother is said to have suffered from a metabolic disease but information could not be obtained about its type.

Insulin of varying kind had been administered since 1938 and now the patient is given daily 10 units of insulin Leo + 4 units of insulin Leo retard in the morning and 6 units of insulin Leo retard in the evening.

It is difficult to keep his diabetes balanced and the patient has repeatedly been admitted to different hospitals both in Denmark and Norway, where he has had work for some years, until in 1954 he had to give up his work owing to his diabetes, in which complications have now arisen with nephropathia diabetes and retinopathia diabetes.



*Fig. 1.*

The healed fracture.

In 1954 he was given an invalid pension.

In the summer of 1957 the patient fell from his autocyce and struck the right crus and foot: the lowest part of the right crus and foot joint became swollen and discoloured. The disease was regarded as a severe sprain and the patient rested at home for 14 days before he was admitted to hospital.

The X-ray showed nothing definite on admittance and it was not until 3 weeks later that a transverse fracture was found through the lowest part of the right tibia proceeding down into the ankle joint. The patient had splints for 6 weeks after which the fracture was healed. (Fig. 1).

6/3-29/3, 1958, i.e.,  $\frac{3}{4}$  year afterwards the patient was again admitted owing to severe swelling of the right ankle joint and then those findings were made which led to the patient's removal to the Orthopaedic Ambulatorium, Aalborg.

On examination here the right ankle joint was found to be severely swollen, the right foot to be subluxated in the varus position, so that the patient walked on the lateral edge of the foot, but without admitting pain. (Figs. 2 and 3). There was good pulsation in the dorsal artery of the right foot, but sensibility was considerably reduced or completely absent from the right knee to the toes.

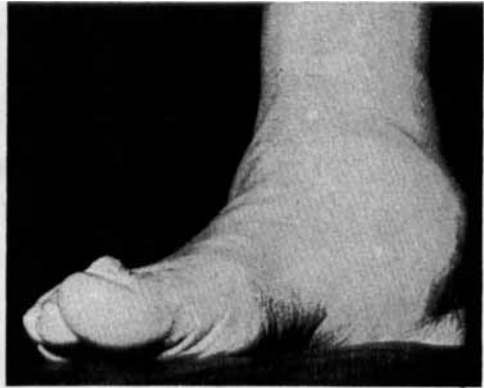
Apart from this there were no neurological symptoms, especially no sign of neurolues or syringomyelia.

WR —, GR —, SR. 80 mm/1 hour, urine + alb., EKG: nothing especially abnormal.

The X-ray showed: right foot subluxated medially. The articular surfaces of both the tibia and fibula and also the trochlea tali were destroyed and surrounded by a sclerotic zone, while the backward part of the talus showed a very irregular upper surface. Around the whole of the ankle joint countless larger and smaller bone fragments could be seen ranging in size from rice grains to peas. In addition calcification was observed in the joint capsule indicating regenerative changes. (Fig. 4).



*Fig. 2.*



*Fig. 3.*

*Fig. 2.*

The swollen foot in varus position.

*Fig. 3.*

The swollen foot from the medial side.

*Fem., E.C., aged 62, N 26712.*

The patient has had diabetes from the age of 50, and receives now 14 units of insulin daily. She has been admitted to hospital 7 times for her diabetes and at the last admittance in 1953, retinopathia diabetes was ascertained. From the age of 20 the patient has suffered from varicose veins and these have become worse of recent years and cause some difficulty.

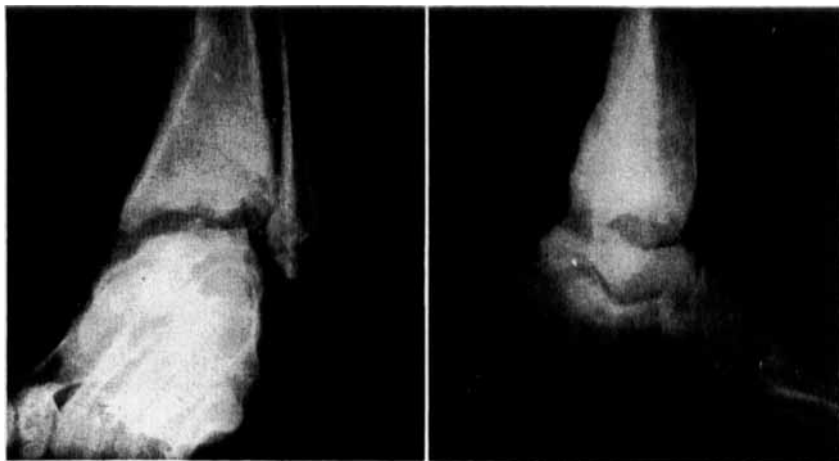
In the middle of July, 1958, the patient fell and twisted the left foot; she was given treatment at home, but since the swelling did not diminish the patient was taken to the surgical ambulatorium 5 weeks after the accident. The patient was X-rayed here and it was thought that a fracture of the mall. med. sin. was involved but the patient was sent home with a supporting elasticbandage and without other treatment.

On the 3/10/58 we saw the patient at the Orthopaedic Ambulatorium, Aalborg; on examination the left foot and the ankle joint were found to be severely swollen with the foot standing in the varus position, and with considerable lateral movement in the left talocrural joint. The right foot was somewhat swollen corresponding with the dorsum of the foot. (Fig. 5).

There was good pulsation in the dorsal artery of the foot in both feet, varicose veins in both legs and some edema.

In the right leg sensibility was much reduced from the knee to the toes, in the left leg from 10 cm. below the knee to the toes.

The X-ray showed destruction surrounded by sclerosis in the left talocrural joint, Chopart's joint and Lisfranc's joint, and also in the right foot in Lisfranc's joint with destruction of the base of the metatarsal bones. All the destroyed joints were surrounded by larger and smaller bone fragments. (Figs. 6 and 7).



*Fig. 4.*

X-ray of ankle joint in pat. no. 1.

*Fem., A.D.J., aged 65, N. 22953.*

The patient has had diabetes for about 15 years; she recalls only that it was ascertained during the climacterium. She now receives 10 units of insulin mane.

In 1957 she was admitted to hospital for her diabetes and for arthrosis gen. sin.

Besides the arthrosis gen. sin. a fragment resembling a fracture was discovered in the X-ray at the edge of the right tibial condyle. The check picture 26/6/57 showed this fragment to be dislocated distally and medially, and then subluxation was found in the right knee with some varus position. There were no signs of tuberculosis of the right knee.

The patient came for examination to the Orthopaedic Ambulatorium, Aalborg, 14/8/1957 and the examination showed: right knee severely swollen, measuring in circumference  $+4\frac{1}{2}$  cm. of the right knee, which is in a varus position, such that the right leg's axis falls 2 cm. outside the 5th toe.

Flexion-extension is  $90^{\circ}/180^{\circ}$ , + evaluation of the patella, + lateral shifting, especially medially, no drawer symptom, no varicose veins of the right femur.

The patient was issued with a supporting-frame knee capsule.

On the 10/10/1958 a check examination was made of the patient who had been called to the hospital as the fracture diagnosis was not certain.

The patient then stated that from the 9/4-5/9 she was lying in hospital under treatment for a pertrochanteric fracture of the right femur, that bed rest was the treatment and the fracture was then declared to be healed.

The condition of the right knee was unchanged, but the flexion-extension was then only  $150^{\circ}/180^{\circ}$ .

The 10/10 X-ray showed: right knee. The bone fragment lay as before, but there was now seen an irregular defect at the site of the fragment in the medial tibial condyle. Moreover, an initial defect was seen in the lateral femoral condyle and in front of this 2 fragments the size of rice grains.



*Fig. 5.*

Photograph of pat. no. 2's legs and feet.

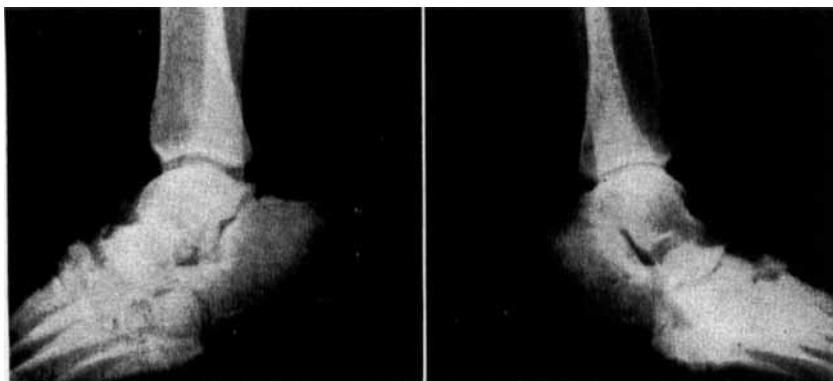
We constantly follow this patient in order to observe the development, since we believe that it is a question of an arthropathia diabetica.

Arthropathia diabetica was first described by *Bailey & Root*, who wrote in 1942 about "Neuropathic joint lesions in diabetis mellitus" (1) and again in 1947 described the disease (2). Later and particularly from the American and English side a number of articles were published about arthropathia diabetica, so that, in all, 89 cases have now been described.

The largest series describing the disease is to be found in a study by *Miller & Lichtmann* from the Joslin clinic; here 17 cases have been collected over a 5 year period, 1950-1955 (7) from a total of 20,000 diabetics.

On the Scandinavian side *J. Muri* (3) described in 1949 a case of arthropathia diabetica and *Professor Folke-Knudsen* (10) in 1951 reported 4 cases from the University Hospital Radiological Clinic, in Upsala.

No case has so far been published in Denmark. The majority of authors regard the diabetic arthropathia as belonging to the neuropathies, while individual authors constantly maintain that it is due to an infection. The fact that biopsy in the joint capsules in the affected joints, undertaken and described by several authors, does not show inflammation reaction in these joints rules against the latter theory, however. In several cases there was either in the post mortem section



*Fig. 6.*  
X-ray of pat. no. 2.

fat degeneration of or lack of myeline sheaths in the nerves corresponding to the extremity involved, especially in the nerves of the leg. Moreover, in 1917 *Eloesser* described some experiments on cats, in which by severing the dorsal nerve roots he produced asensibility in the extremities and afterward produced fractures of these extremities: in a number of the cases joint diseases (Charcot's joint) arose which fully recalled those seen in arthropathia diabetica.

Almost all authors are agreed that the disease occurs in diabetics who have suffered from their diabetes more than 10 years, and owing to poor regulation of their diabetes have neuropathies, retinopathies or nephropathies and also by way of initial onset incurred a trauma of the affected joint of varying degree: often this trauma was not noticed by the patient owing to the absent or much reduced sensibility of the extremity.

Arthropathia diabetica is an irremediable disease and even with good regulation of the diabetes it is in the majority of cases progressive although at a slow rate.

The initial symptoms are swelling of the affected joint or joints, often with subluxation of the joint, especially if the joint attacked is the talocrural joint; sensibility is also much reduced or completely absent over varying areas of the affected extremity, which means that the patient can walk on the affected joints without pain, thus aggravating disease by putting weight on the joints, often in poor position.

Radiologically destruction of the affected bone or bones is found with sclerosis round about and accumulation of bone fragments vary-



*Fig. 7.*

X-ray of pat. no. 2's forefeet.

ing in size around the affected joint, with also occasionally some calcification of the joint capsule and soft tissues around the joints indicating regeneration.

The differential diagnosis with respect to corresponding joint affections with lues, especially in tabes dorsalis should not cause difficulty, since WR in blood and spinal fluid will give the diagnosis in these cases. Syringomyelitis may equally produce corresponding joint changes but while diabetic arthropathia is localized in almost all cases to the lower extremities, syringomyelitis is localized to the upper extremity just as in syringomyelitis other typical neurological symptoms are found.

The treatment of arthropathia diabetica is limited to the equipping of the patient with suitable splints and the treatment of their diabetes. In America surgical treatment of the affected joints has been tried, e.g., arthrodesis of the talo-crural joint, but the results were not good, as the healing was poor.

All authors are also agreed that suitable splints and footwear should be provided. In this respect one must be careful not to apply pressure, since the patient has reduced or absent sensibility.

In cases of need amputation may be involved but the majority of authors only recommend it as a treatment to save life, and in such a case femoral amputation is the rule.



*Fig. 8.*

X-ray of knees of pat. no. 3.

#### S U M M A R Y

After a short review of the available literature on Arthropathia diabetica 3 cases of this disease are described which were treated at the orthopaedic out-patient department, Aalborg.

The symptoms, diagnosis and treatment of the three cases are reported and finally the classification, differential diagnosis and various methods of treatment are described.

#### R E S U M E

Après avoir sommairement en revue la littérature existant sur l'arthropathie diabétique, trois cas de cette maladie, traités à la Clinique Orthopédique ambulatoire d'Aalborg sont décrits.

Il est donné un aperçu des symptômes, du diagnostic et du traitement dans les trois cas. Discussions sur la manière dont la maladie s'est manifestée, le diagnostic différentiel ainsi que différentes méthodes de traitement.

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Following the conclusion of this work two articles by O. Aagaenæs and N. R. Haagenæs were published on the same subject. U.F.L., 121: 569, 1959 and U.F.L., 121: 572, 1959.

## ZUSAMMENFASSUNG

Nach einer kurzen Durchsicht der vorliegenden Litteratur über arthropathia diabetica, werden 3 Fälle dieses Leidens, die am orthopedischen Ambulatorium in Aalborg behandelt wurden, beschrieben.

Man gibt eine Übersicht über Symptome, Diagnose und Behandlung dieser drei Fälle und schliesslich erörtert man die Entstehungsweise, die Differentialdiagnose und verschiedene Behandlungsmethoden.

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