PROCEEDINGS OF THE NORDISK ORTOPEDISK FÖRENING'S 26TH ASSEMBLY IN OSLO JUNE 1952

The meeting of the Scandinavian Orthopedic Association was held in Oslo under the presidency of John Hald, Oslo.

THE TREATMENT OF POLIOMYELITIS DURING THE FIRST TWO YEARS

Speakers: *Peter M. Holst,* Oslo, *Ragnar Magnusson,* Linköping and *Ivar Alvik,* Oslo.

Peter M. Holst:

In Norway epidemics of p. have occurred with increasing frequency and number of sufferers since 1936. A peak was reached in 1951, when 2217 cases were notified. Oslo (population 400.000) had 283 paretic cases and 156 cases of serous meningitis, which must be supposed to have been p. In the epidemic of 1951 the age group 0–5 years had a comparatively higher morbidity than has been the tendency in many other places during the last few decades. The varying morbidity in the different parts of the city could not be explained.

In author's opinion public health authorities have no means of controlling the disease by quarantine measures, which ought to be abandoned as useless. Since 1936 the municipal hospital of Oslo has treated 140 cases of respiratory paralysis in respirators with a mortality of 85 %. Physical training of the patients has been supervised by neurologists, but should in author's opinion be left to orthopaedic surgeons comparatively early. Too much money, time and energy is spent in prolonged treatment of hopeless cases.

(The paper is published in detail pp. 273–282).

R. Magnusson:

Orthopedic therapy in poliomyelitis must begin as soon as the patient enters the hospital for infective diseases with an examination of the position of the paretic parts of the body. For the duration of the stay in the hospital physiotherapy is practised under observation and after discharge the patient is reexamined at equal intervals according to the nature of the case. Various therapeutical measures, both conservative and surgical, are applied at the time when these, after careful judgement, are considered to be necessary. 135 cases of poliomyelitis from the period 1946–50 were treated according to these principles. After 2 years treatment and follow-up examination on the lines stated above 44 patients were completely free from pareses. Statistically the improvement among the slighter forms of pareses was 68 %, amongst those of medium severity 53 % and amongst the severest pareses 28 %.

(The report on this series will be published in more detail in Acta orth. scand.).

I. Alvik:

In the acute stage, as soon as paralysis sets in, static measures play the most important role. The greatest care must be given to the placing of the paralysed extremities from the very beginning. It is essential to provide the musculature with the best functional conditions, to avoid even the slightest overstretching, and prevent secondary weakening of muscles and muscular dysfunction. The placing of the affected parts of the body is then determined from the paretic muscle groups together with the position of the joints at rest, the equilibrium of the joints and the functional position. First the extremities are placed so that the joints are at rest as much as possible. When the paralytic process has been arrested this position is adjusted so that the paralysed or nost paralysed musculature is shortened somewhat in relation to its position at rest and still further adjustments are made so that the musculature which is functionally the most important is rather more shortened than the functionally less important antagonists. It is only later during bed-rest that it becomes more urgent to pay special attention to deformities of the joints. A new type of foot support for patients confined to bed is described. The most dangerous of all positions during bed rest is the sitting position with straight knees.

The most important treatment consists in active exercises which must be initiated almost from the very first day. These comprise assisted movements, simple unconnected movements, coordinated movements and movements against resistance. It is essential to be on one's guard against muscular disfunction, which can often be more difficult to master than the paralysis itself; the best method of avoiding this or of reducing it to as little as possible is the early commencement of coordinated exercises. Substitution and compensatory movements must not be allowed during the first stage as they suppress the nerve impulses and prevent the restoration of the temporarily paralysed or partially paralysed muscles. On the other hand when it is clear that the original function cannot be recovered, training in compensatory and substitution movements becomes very important.

Powerful stretching, including over-stretching of non-paralytic or slightly paralytic antagonists, is vital if contractures, paralytic scoliosis and other deformities are to be avoided.

The question of splints must be determined individually in all cases and not schematically, according to the general rule that all movements below the standard of fair require splints.

A considerable number of the dynamic conservative operations and some of the stabilising operations can advantageously be performed during the first two years. This refers particularly to tendon transplantations which are described in more detail. It is especially important that a weak muscle intended to replace a stronger one, is trained as well as possible for the transplantation with strong resistance exercises, and for long periods afterwards. If this is not done, the nerve impulse is suppressed and the muscle loses its effectiveness.

Unilateral hip joint arthrodesis is more widely recommended than hitherto and similarly with early correction and operative fixation of paralytic scolioses.

A REPORT OF THE LAST FIFTEEN YEARS' PHYSICAL AND ORTHOPEDICAL TREATMENT OF POLIOMYELITIS IN JYLLAND. A FILM WAS SHOWN ILLUSTRATING THE SUBJECT

by *E. Thomasen* (Aarhus)

In the Orthopaedic Hospital in Århus and in the connected B-hospital of the Folkekur Institute at Hald a combined treatment of poliomyelitis has been carried out during the last 15 years, the treatment beginning 3–4 weeks after the acute stage of disease has ended.

1944 patients were given treatment.

1347 patients received physical therapy, almost all during their stay in hospital.

935 patients were supplied with splints and 1175 with orthopaedic footwear.

605 patients were treated by orthopaedic surgery.

Re-examination of the patients is important and so is the social aid which can be rendered in various ways.

(To be published in more detail in Acta orth. scand.).

DISCUSSION:

A. Monberg (Copenhagen): I should like to describe how the treatment of infantile paralysis patients is organised in the area covered by the Copenhagen hosiptals i.e. Copenhagen and its surrounding municipalities, in all, about one million human beings. Patients with infantile paralysis are sent to Blegdamshospitalet in Copenhagen, to which, apart from the Professor in Epidemiology, consultants in physical medicine and orthopaedics are attached, so that from the very beginning of the disease the different departments collaborate closely.

A chart showing the number of patients during 1942–51 and a graph curve of the cases of disease throughout the whole country from 1932–51 reveal that in '34 and '50 there was a striking number of non-paralytic cases. Before this I had made an estimate of the incidence of invalidity from the epidemic of '34 and I discovered that there was a mortality rate of 12 %, that 10 % became unfit for work and received invalid benefit and that 10 % were so incapacitated that they could not manage for themselves. 20 % could successfully look after themselves, having but slight malformation (splints, footwear) 48 % were completely fit for outside work, but according to the type of the disease. Skinhøj found ('44 epidemic) that 72 % were fit for work, 18 % had reduced capacity and that 10 % were invalids.

During the epidemics the places of origin were observed but no regularity respecting this was noted. The disease arose at points spread out over the whole town.

When patients were brought to hospital they were settled down as restfully as possible and were bedded on a mattress beneath which lay a wooden board so that no hollow should be formed in which the patient could roll himself up.

Pulse respiration, secretion from the throat and retention of urine are taken into consideration. Pain and restlessness are treated with medicaments.

As long as the patient has a temperature no treatment is given, since during this period the outbreak of pareses can constantly be expected.

As soon as the patient no longer has a temperature and preferably is free from pain the simple muscle groups are examined and the total and partial pareses are marked up on a muscle chart. This muscle chart gives an indication of what malformations can be expected and with some experience a prognosis can be made

and thus one can give information to those it concerns about the prospect for the future.

Some of the patients–about 20 %–have pain over a short or long period. The cause of this is not clear; perhaps it is due to a natural reaction of the remaining fibrils, which increase the contraction, perhaps it is due to vasomotor changes or local reactions owing to virus accumulation. As long as pain exists no active movements can be undertaken since this further diminishes the ability to contract.

In order to relieve the pain "hot-packs" are widely used, warm woollen sheets of varying sizes and shapes corresponding to the different regions. The woollen cloths are boiled in a centrifugal machine which wrings out the water through the rotation, so as not to cause burns on the skin. Demonstration of the machine and the shape and arrangement of the sheets. The hot packs have a very soothing effect.

As soon as the patient no longer has a temperature the systematic exercising of the muscles and the preparation of plaster or light metal are commenced in order to prevent the arisal of contractures.

The patient is kept in bed for 3 weeks if there has been no danger to respiration and the patient has no temperature. It is often necessary to make fixation splints for the knee in order to prevent contracture (even when he quadriceps function is only slightly reduced). One category of patient must remain in bed for a long period i.e. patients with pareses of the back and abdominal muscles since if the patient gets up too soon, the formation of scoliosis is aided.

Patients are given warm baths because apart from the good local effect psychological benefit accrues owing to the elimination of weight, with the result that the patient experiences a freer and easier mobility.

When patients are supplied with lighter aids they can be treated as ambulatory patients through the physiotherapeutical orthopedic service. In Copenhagen the Institute of Infantile Paralysis is to be found, created by the National Society to combat infantile paralysis and its consequences. This society is a private one and its objects are

1) to support scientific research,
2) to help patients and those who are convalescing,
3) to support mutual Scandinavian and international collaboration in the fight against infantile paralysis.

The means towards the above are obtained through donations and an annual "Flower Day" (valued at about 180,000 kr.). Members number 50,000 and in all income amounts to about 250,000 kr. yearly.

The Invalid Insurance Fund pays the expenses for splints, the Sick Fund pays 1 krone towards each treatment, and the Health Insurance pays one half and the clinic the other half of the expences for the treatment.

These are the lines on which patients are treated in the region covered by Copenhagen Hospitals; the close co-operation between epidemiologist, physiotherapist and orthopedist at the very beginning of the disease is of major importance and avoids the arisal of the later well-known cases of contracture.

Ideally the patients should be given treatment for one year at a sanatorium where the children would be educated at the same time as they were given medical care; this would have the psychological advantage that the children would reconcile themselves more easily to their fate when they were brought up amongst other children with the same fate.

Nilsonne, Stockholm, *Örn*, Linköping, *Flaum*, Lund, *Bentzon*, Aarhus.

Agerholm-Christensen (Oxford): As *Nilssonne* pointed out, we have not heard anything today which *Haglund* has not described.

I had hoped that *Thomasen* could present some facts about the significance of the electrotherapy of the paralysed muscles.

At the Poliomyelitis Congress in Copenhagen 1951 *H. J. Seddon* maintained that there were no indications for the electrotherapy of poliomyelitis patients. Thomasen has opposed this–and I think with every reason. But we have not produced any evidence justifying our opinion. For all that much time and large sums of money are being spent today in Denmark in carrying through this treatment.

It is clear to me that Thomasen has a great opportunity to give us a clinical impression of the importance of electrotherapy in our field. *P. G. K. Bentzon* collected at the Orthopedic Hospital, Aarhus, a large polio series which was investigated and followed up with exceptional care for many years, and muscles were accurately charted either by himself or his associates.

The series covers a good 14 years. The patients of the first 7 years were not treated by electrotherapy, only those of the latter years. I suggest therefore to Thomasen that he studies this unique series so that we may soon obtain more reliable indications for electrotherapy.

F. Langenskiöld, Helsingfors, *Silfverskiöld,* Stockholm, *Holst,* Oslo, *Magnusson* Linköping, *Alvik,* Oslo.

CASES OF BONE AND JOINT TUBERCULOSIS OPERATED ON EARLY. DEMONSTRATION OF PATIENTS

by *J. Hald* (Oslo)

RESORPTION OF STREPTOMYCIN IN TUBERCULOSIS OF THE JOINTS

by *M. Fellländer* (Stockholm)

The concentration of streptomycin in blood and joint exudate was determined by a microbiological diffusion method. By repeated tests after systemic administration and after local application curves were obtained, on which the dosage was based. A concentration of 1–2 μg per ml should be maintained to assure bacteriostatic effect.

Single doses of ½ g of streptomycin injected *intramuscularly* produced *a* slowly rising curve with maximum concentration of about 5 μg per ml of joint exudate after 3 to 8 hours (three patients were examined). Twelve to fifteen hours after injection the streptomycin level was still effectively high (three patients were examined after receiving 1 g intramuscularly).

Doses of 1 g administered *intraarticularly* gave a very high concentration which fell slowly during the day. It remained effectively high for 30 hours or longer (three patients were examined). The blood streptomycin level was also relatively high immediately after intraarticular administration alone, and remained high for several hours, as after intramuscular injection. The curve for the blood resembled that for the exudate after intramuscular administration, which suggests that the drug passes the synovial membrane at approximately the same rate in both directions from the joint cavity and the general circulation, respectively.

In addition to these serial tests after the administration of single doses, the streptomycin concentration was determined during the course of treatment. It was found that after injection by the *intraaricular route alone* an interval of 3–4 days was too long–no streptomycin remained in the joint at the next injection.

With daily doses the effective level was maintained. When the drug was given every other day, the concentration was in some cases effectively high at the next injection, while in others no streptomycin was present in the exudate.

As a result of these experiments the following dosage schedule for streptomycin therapy in tuberculous synovitis is being tried: a single daily dose of 1 g given intramuscularly. Although this might be sufficient, 1 g is also administered intraarticularly twice a week, to increase the effect. The treatment is given over a period of six weeks.

To keep a check on the streptomycin level under this regimen some determinations of the concentration are made during the course of treatment. It is found that as a rule the minimum level is high enough to be effective.

INTRA-ARTICULAR STREPTOMYCIN TREATMENT OF SYNOVIAL TUBERCULOSIS IN THE KNEE JOINT

by *J. Hald* (Sandvika).

Our orthodox treatment of synovial tuberculosis in the knee joint has not usually produced lastingly good results. Even if we have spared the knee for months and years and immobilised it in plaster the distinctive process has not ceased to advance further and finally we have been compelled to perform resection.

In the few cases in which the process stopped, considerably limited function was seen and also a tendency towards flexion contracture which is surely the most dangerous malposition of the knee.

Therefore when we began to employ the new chemo-therapy against tuberculosis 4 years ago we were very anxious to try this in tuberculosis of the knee joint.

The information which I can give today about our material must be regarded as a preliminary report. The number of patients is too little and our observation period too short to allow us to draw definite conclusions. The results which we have obtained so far, however, seem to be sufficiently worthwhile to justify us in bringing forward our method as a basis for discussion.

We have treated our synovial tuberculous cases with intraarticular injections of streptomycin and have given 3 to 4 injections a week of 1 gr. dissolved in 5–10 mil. of water. Where there was exudate in the joint it was tapped as well as could be done before the injection. During the same period we gave normal doses of streptomycin, ½ gr. twice daily, and only on the injection day did we reduce this to a ½ gr. in the evening.

Streptomycin was administered for 6 to 7 weeks i.e. most patients have received between 20 and 24 intra-articular injections and in all have received a streptomycin dosage of 60–70 grs.

Before, during and after the streptomycin treatment PAS was given in granular form, 12 grs daily, usually 1000 grs or more.

During treatment the patients lie all the time in bed in order to avoid any weight-bearing but active and passive knee exercises are performed throughout this period.

When we carry out resections of knee joints with very advanced destruction we usually find some small almost normal areas of cartilaginous surface, just where the condyles make contact, where cartilage grates against cartilage.

The articular cartilage receives its nourishment from the synovial fluid but if this does not pass over the articular surfaces and if these do not rub against

each other, a vascular granulation tissue grows over the cartilaginous surfaces from the surrounding folds of the joint capsule. This granulation tissue prevents the nourishment of the cartilage and at the same time these granulations seek to penetrate beneath the cartilage and undermine it.

The cartilage in every infected joint is always softened and somewhat, less capable of resistance. It should therefore be spared any weightbearing but at the same time it should be given the best opportunities to obtain nourishment and this is so when the joint is exercised. This is the reasoning which forms the basis of our treatment.

When we administer streptomycin intramuscularly we do not yet know with certainty how strong a streptomycin concentration we are building up e.g. in a joint or an abscess. Under normal articular conditions the streptomycin is precipitated in the joint, and vice versa, if it is injected into the joint the medicament is resorbed through the synovial membrane and passes into the blood. But we are not yet fully cognisant of the pathological conditions of the joint. By making injection directly into the joint we also achieve a certain local effect and early in the course of the disease it should be possible to influence the completely elevated tubercles in the synovial membrane.

Before such a treatment as is presented here is begun, the diagnosis must naturally be verified. If the clinical evidence of tb. infection continues to be suspect even if the results of inoculating from the knee punctate are negative an explorative arthrotomy must not be delayed. When the knee joint is thus opened to obtain biopsy material it should be taken from the surrounding folds of the capsule, not from the resessus superior, and the material must be inoculated in guinea pigs and a culture made for TB testing and cut in histological sections.

In all we treated 17 tuberculous knee joints with intraarticular injections but up to this meeting I have followed up 13 of these obtaining a minimum of 1 year's observation.

The 13 have been observed over 12–46 months, with an average observation period of 21.5 months. This is too short a time from which to draw definite conclusions, as I have already stated, and I again emphasise that our results must be considered as a preliminary report.

5 of the 13 patients are women aged from 19 to 33 years, 5 are men aged from 20 to 59 years and 3 are boys 2, 5 and 14 years old respectively.

Very good results have been achieved in 10 cases and the average observation period for these 10 has been 24 months.

The 3 unsatisfactory cases are as follows:

A 29 year old man with spondylitis, lung tb. and synovial tb. had a recurrence of exudate after ten months. He continues to posses free mobility, flexes his leg until it touches his thigh but hyperextension is painful for him. We have again observed TB growth in the joint exudate. The bacilli are being tested now for resistance and the reply will decide our future treatment[1].

A 34 year old naval officer has been at work for 16 months but exudate continues to be present in the joint. This has been examined twice but the results were negative. He has been punctured again and the last time the punctate was slightly tinged with blood. He has complete powers of extension, flexes the leg 25 degrees beyond the right angle and is on active service, but I consider the condition to be, clinically, a recurrence.

[1] The bacilli were streptomycin-sensitive and he is now being treated with a new course.

A 5 year old boy was completely symptom-free for 13 months, but after a slight trauma to the knee 3 months ago a swelling appeared and his mobility was not as good as before, at the last examination. Even if we here have no objective proof that the process in the knee is inflamed he is clinically suspect.

The remaining 10 patients all have completely free powers of extension. 4 flex the leg exactly as they flex the healthy limb, so that the leg touches the thigh, while 3 flex 20–25 degrees beyond the right angle. All are at work or at school. The 2-year-old is now more than 3 years and runs and plays like other children; none of these 10 have joint exudate. A slight muscular atrophy can be found in all, however.

In these cases the diagnosis was made on the basis of knee punctate in 9, and only after an explorative arthrotomy in 4.

Apart from these knee cases which we ourselves have treated by chemotherapy we have check-examined a 22 year old plumber treated at another hospital. In the summer of 1950 his left knee became stiff and painful and he was given plaster treatment for 3 months. Cultivation-inoculation of the exudate was negative this time. 12/4/51 it was proved TB by an explorative arthrotomy. The knee was again put into plaster and he was given 50 grs of streptomycin intramuscularly. Immobilisation continued for 4 months and since he was very distressed by the small amount of mobility in the knee he was admitted here 12/10/51. We found a pasty swelling of the knee joint without fluid, the patella was not movable from side to side, hyperextension was prevented and only 45 degrees of flexion existed. The patient remained in the department for about 1 month and after exercise and training flexion was increased to 70–80 degrees but on examination some weeks ago his mobility had become as small as before. The circumference of the left knee measured 5 cms more than the right and a severe atrophy of the thigh musculature was present.

So far no certain destructive foci have appeared on roentgen examination, but no particularly favourable effect can be claimed from the use of chemotherapy in this case. Whether more could have been done by administering it intra-articularly or by active and passive exercise during treatment is an open question and it is this indeed which must be discussed.

In connection with this paper 1 female patient, 33 years old, was demonstrated, she had been observed 18 months after the course of streptomycin. On admittance she had 15 degrees flexion contracture in the left knee, there was a large swelling of the capsule and considerable exudate; thus the left knee measured 3 cms more than the right. She was given 23 intra-articular injections, altogether 68 grs of streptomycin and 1315 grs of P.A.S. She demonstrated free mobility, and normal knee contours, she could limp just as easily on both legs, she walked lightly on her toes and could walk on both heels,–a functional test which reveals the valuable extension powers of the knee.

Roentgen examinations of the above-mentioned patients have not shown any definite bone foci, only the normal picture with some reduced joint spaces and diffuse blurring, owing to density of the soft parts together with a bone atrophy. In correspondance with clinical improvement almost normal bone structure has appeared in the condyles but in several cases we have observed slight arthrosis changes, with some edging of the condyles and tapering intercondyloid eminences.

We do not maintain that this treatment with intra-articular injections and movement is the only method of effecting a recovery. In bone and joint tuberculosis the treatment can never be standardised, it must be, to a great degree,

individual. If the synovial tuberculosis has existed for a long period with severe proliferation total synovectomy is certainly a better procedure and we have performed this too in some cases and have used chemotherapy for the after-treatment. The results have been good so far.

We consider however that our results after intra-articular injections and active exercise of the knee have been encouraging and shall be glad to hear the opinions of others.

DISCUSSION:

Wallgren, Helsingfors.

Støren, Stavern. Since 1948 when we first began to use streptomycin here at the Coast Hospital in Stavern, we have also treated all synovial manifestations of knee joint tbc. with an eye upon mobility.

At the arthrotomy which we performed to verify the diagnosis we administered 1 gram of streptomycin in powder form–otherwise the streptomycin was given by intramuscular injection, ½ gram twice daily for 60 days, amounting to 60 grams. In one or two cases this treatment was repeated.

A partial synovectomy was carried out in one case only. This case did not give any better result than the others. We have also had some cases of para-articular bone foci with secondary affection of the synovial membrane. Here we removed the para-articular focus obviously.

Fig. 1 shows the condition of a 27 year old woman three years after a tuberculous synovitis had been demonstrated by biopsy and culture. Extra-articular treatment with streptomycin following the method described above ended a year ago.

So far the results have been very promising. The length of observation is indeed too short but a comparison with a number of tbc. synovitis cases prior to the advent of streptomycin tells us much. See the following tables.

Besides these we had 5 cases of tuberculous synovitis of the knee joint which led directly to resection or to rigid knee joints after the usual conservative treatment.

But one must remember, on careful re-examination of the material that it is possible for many years back to find several cases of apparent healing analogous with case 5.

By way of comparison a survey is given of the tuberculous synovitis cases of the knee-joint which were treated by streptomycin.

Comparison of these two surveys provides evidence showing that the latter results, in spite of the short observation period, are considerably better than those before the time of streptomycin.

Even if exceptional cases of apparent healing are encountered before streptomycin's time, not one of these showed even in the first years such promising clinical and roentgenological signs of healing.

Case 2 of those treated with streptomycin indicates however that one should not be too optimistic.

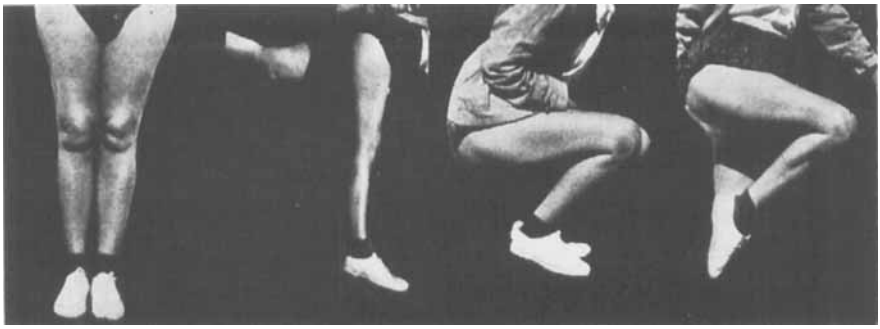

Fig. 1.
3 years after tbc. synovitis was established at biopsy and on culture.
1 year, after the end of the streptomycin treatment.

TABLE I

Cases of tuberculous synovitis of the knee joint with resultant mobility-adults. Prior to streptomycin.

Treatment ceased	Extent of mobility and freedom from pain at discharge	Recurrence (inflammation)	Duration of relative freedom from symptoms	Final result
Case 1. A.F. Nov. 42	45° flexion, full extension, no roentgen. destruction	acute July 1945	6 years	resection
Case 2. M.M. 2/2/40	50° flexion, full extension, some pain	partial deterioration 1945-47	5 years	resection
Case 3. R.L. 19/11/45	45° flexion, pain-free, some thickening of capsule. No roentgen. destruction	acute deterioration February 1947	3 years	resection
Case 4. J.S. 1925	90° flexion, deformed knee joint, no special pain	partial deterioration 1952, tbc. ascertained by biopsy	26 years	resection
Case 5. P.S. 1944 tbc. established in biopsy	90° flexion, full extension pain-free, slight thickening of capsule Rtg: clean articular surfaces	Nothing to date	7 years	Apparently healed with 90° flexion and full extension
Case 6. S.N. 1941 (not diagnosed)	40° flexion, some pain, thickening of capsule	1947: increasing pain, diagnosis established	6 years	resection
Case 7. I.R. 13/7/46	40° flexion, not completely free from pain	1948	1 year	resection

TABLE II

Tuberculous synovitis treated by streptomycin and without immobilisation splints or if so, only for a short period.

Treatment	Extent of mobility and freedom from pain at discharge	Recurrence (inflammation)	Duration of relative freedom from symptoms	Final result
Case 1 R.T. 4 years ago	90° + 40° free from pain	Nil as yet	4 years	Increasing mobility Now 90° + 40° Full extension Pain-free
Case 2 B.R. 2 years ago. Extra-art. focus with fistula. Simultaneous tbc. synovitis	90° flexion, full extension Pain-free	After 2 years a fistulous outbreak occurred which healed after a metal wire suture was removed. Granulation tissue demonstrated tbc. on culture, however. A fresh course was given.	?	Increasing mobility. Now 90°. Full extension. Fistula almost treated Pain-free
Case 3 T.J. One year ago.	90° flexion full extension, pain-free	Nil as yet	½ year	Increasing mobility. Free from pain.
Case 4 A.G. One year ago. (Partial synovectomy)	Flexion: 90 + 50° Full extension	Nil as yet	1 year	Increasing mobility Pain-free.
Case 5 B.M. One year ago.	Flexion: 90 + 70° Free from pain	Nil as yet	1 year	Normal mobility and appearance Fig. 1. Pain-free.
Case 6 A.T. (1½ years ago. Extra-art. focus + synov. tbc.	Flexion: 90 + 70° Full extension. Pain-free	Nil as yet	½ year	Normal mobility and appearance. Pain-free

Ahlberg, Varberg, *Hirsch*, Stockholm, *Felländer*, Stockholm.

FUNCTIONAL PLETHYSMOGRAPHY IN DISTURBANCES OF THE CIRCULATION FOLLOWING POLIOMYELITIS

by *K. Dohn* (Copenhagen)

The reason for the coldness and bluish discolouration of lower limbs suffering from the after-effects of poliomyelitis is generally ascribed to the presence of angiospasms, causing a reduced flow of blood, which also accounts for a possible arrest in growth. Moreover venous congestion due to failing function of the muscle-vein-pumping is declared to be of importance for the trophic changes.

We have prepared in the Copenhagen Orthopaedic Hospital a new technique for plethysmography which, apart from the prevalent determination of the blood supply in a person at rest and in the prone position, also includes measurement of the changes in volume under functional states, such as during walking. Therefore we made some investigations on six lower extremities in five patients suffering from the sequels of poliomyelitis.

Two children with considerable shortening of the extremity, but only with slight disturbances in circulation from the clinical point of view, exhibited plethysmographic signs of a larger vasomotor tonus and a lesser blood supply of the affected extremity than of the healthy one. In an adult with pronounced bluish discolouring and reduction in skin temperature the blood supply was found to be only one fourth of the normal both in the leg and foot. Conversely an adult whose extremity clinically resembled that of the last-mentioned patient exhibited a blood supply four times as large in the leg of the affected extremity as in the healthy one and the blood supply to the foot had also increased. This unexpected finding was even more pronounced in another adult who had suffered from very severe pareses of both legs for the past twenty years and who had marked trophic disturbances with chilblains. The extremity most affected revealed a blood supply ten to twenty times above normal in the lower leg. In the other leg the blood supply was five times above normal, while the blood supply to the feet was normal.

In this case a lumbar sympathectomy was carried out on the side which was most severely afflicted; clinically this had an excellent effect on the circulatory disturbances. A fortnight after the operation the blood supply of the lower leg was found to be normal while that of the foot had increased three times. Three months later the clinical improvement was still maintained, but the blood supply of the lower leg had again increased although not to the preoperative level. The plethysmographic findings permit certain conclusions concerning this paradoxical effect of a sympathectomy.

In two of the patients the blood supply was examined during the reactive hyperaemia following ischaemia (by arterial occlusion) and after muscular activity (by walking) and a lesser increase in the blood supply was found under these states than normally. These two patients exhibited a decrease in volume during walking indicating function of the muscle-vein-pumping, although to a somewhat lesser extent than in the healthy extremity.

On the basis of these few preliminary investigations the following hypothesis is suggested:

In lower extremities with disturbances of the blood circulation following poliomyelitis there are changes in the vasomotor tonus, which particularly take the form of an abnormally high vasoconstriction. As regards the circulation *in the skin* of the leg the clinical appearance of *cold, blue* extremities excludes, however,

the explanation that vasospasms are the only circulatory disturbance. Such a state is accompanied by a decreased blood supply, but a normal or increased velocity of the blood flow resulting in *cold* but *not* blue legs. A venous congestion involves a permanently high venous pressure with vasodilation, the consequence of which is a reduced velocity of the blood flow, but not a reduced blood supply and accordingly *blue* but *not cold* legs.

The conclusion is, therefore, that the *blue, cold* legs which are seen after poliomyelitis must be due to vasoconstriction *of the skin vessels* together with venous congestion resulting from muscular inactivity.

When, however, this state can be combined, as shown, with a very large increase in the blood supply of the extremity as a whole, it must presumably be due to local vascular changes in the musculature, possibly to an abnormally high number of open vessels in the paralysed muscles not responding normally to usual stimuli.

RESULTS OF LUMBAR SYMPATHECTOMY IN VASOMOTOR DISTURBANCES IN THE LOWER EXTREMITIES AFTER POLIOMYELITIS

by *B. Paus* (Oslo)

37 cases of lumbar sympathectomy for vasomotoric disturbances in the lower extremity (cold and clammy feet, acrocyanosis, tendency to chilblains, ulcers etc.) following poliomyelitis have been followed-up after ½–7½ years. The operation seems to offer a good chance of curing these unpleasant symptoms. For example, after 2–3 years 14 out of 19 cases showed completely satisfactory results. After 6–7 years 5 out of 5 were completely satisfactory.

(The article will be published in the Acta Chir. Scand.).

DISCUSSION:

Stenport, Helsingborg, *Langenskiöld*, Helsingfors, *Kiær*, Copenhagen, *Silfverskiöld*, Stockholm, *Platou*, Oslo, *Paus*, Oslo.

THE TREATMENT OF FLEXION-ABDUCTION CONTRACTURES IN THE HIP JOINT AFTER POLIOMYELITIS. FOLLOWED BY A FILM

by *E. Thomasen* (Aarhus)

The flexion-abduction contracture in the hip joint in poliomyelitis is not due to the contracture of the m. ileopsoas, since the hip joint can be extended in the abducted position. The abducted extended leg cannot be adducted to the midposition and the adducted flexed leg cannot be extended into the straight position.

Lordosis in a standing position results from the contracture and possibly a crooked pelvis with scoliosis.

The tensor fasciae latae and the tractus iliotibialis play a fundamental part in the contracture: but in older cases one finds in addition contractures of the m. gluteus medius, minimus, sartorius, rectus femoris and lastly of the intermuscular septa and joint capsule of the hip.

Contracture of the tractus is followed by valgus deformity and extension defect of the knee together with outward rotation deformity of the leg from the knee.

The treatment consists in Yount's operation i.e. removal of the lowest 10–12 cms of the tractus + the intermuscular septum and the detachment of the fascia lata and tensor from the iliac crest. In more difficult cases the detachment of the most anterior parts of m. gluteus medius and minimus from the ala is carried out,

together with the severing of the origins of the sartorius and rectus and the opening of the hip joint anteriorly.

After-treatment does not include plaster and the hip joint is slightly extended.

28 cases were treated with good results.

DISCUSSION:

F. Langenskiöld, (Helsingfors): I quite agree with Thomasen's statement, that a flexion-abduction contracture in the hip after polio is mostly due to a shortening of the tensor fasciae muscle and that the best way to release the contracture is to attack this muscle, but I cannot agree that it is wise to do that by destroying the muscle. It seems to me to be much wiser to try to pursue the same goal by transplanting the muscle to a point where it can do no harm but will help to maintain a natural and functionally favourable position. For this purpose, I have practised a method for thirty years, which I have neither published myself nor seen published by anybody else. The method is as follows: the muscle is exposed by a skin-incision, which begins at the iliac crest in the axillar line, curves forward along the crest to the iliac spine and then continues straight caudad along the anterior border of the tensor. Together with the fat the skin is loosened from the muscle and the fascia by blunt dissection to the border of the sacrum. Then the origin of the tensor, the ilio-tibial band and the gluteal muscles are cut free from the iliac crest and the surface of the bone until the ilio-tibial band, by turning the muscle-flap backward, can be brought to lie behind the greater trochanter. This is very important. Two or three strong sutures of silk or some other nonresorbable material are fastened to the origin of the tensor and conducted under the skin-fat-flap to a small incision over the border of the sacrum. Then the whole muscle-flap is pulled backward and held in position by fastening the sutures to the sacrum. The operation restores sometime the active extension of the hip, depending on whether the tensor muscle is damaged or not, but it always prevents a recurrence of the contracture.

I should have liked to have received information about two things. First, is it really possible to overstrain a paralysed muscle and has anybody seen such an overpressure? When a paralysed muscle again begins to work it gets tired soon after a few contractions and the physical therapist must be very stupid if she continues the training after that moment. Secondly: what is the cause of the pain the polio-patient often suffers in the paralysed muscles and especially in the attachments of the tendons? I am inclined to believe that Sister Kenny is right when she states that not only the spinal cord but also the muscles are the seat of the disease, but I should appreciate the opinion of others.

I wish to make some further remarks. A muscle chart is convenient but any records made with the help of such a chart are too dependent upon the personal estimate to be quite reliable.

Improvement does not stop in the second year, as has often been said. It can be seen to continue for five years or more.

Lastly I remember a paper by McCarroll and Crego, 1941, in which the authors stated, that among their cases the patients who received no treatment whatever in he early stage but obviously began to walk as soon as they could, showed the best results.

DISCUSSION:

Støren, (Stavern): In grafting the iliotibial bands into the abdominal wall, using

Lise G.

Fig. 1. Grafting of the iliotibial bands onto the abdominal wall-Thomasen's method.

Thomasen's method–it is theoretically possible that the two taut transplanted bands may have an action like a bowstring upon the lumbar column-and can produce or help to produce a lumbar kyphosis.

This will occur particularly when the children are growing up. Then the tract grafts do not grow in harmony with the children and the tautness may increase still further.

I show here a case which confirms this hypothesis: fig. 1.

After the operation her mother noticed that she developed a curvature in the small of the back. There was a labile kyphosis corresponding with the centre of the lumbar column. No paralysis of the back muscles. The kyphosis allowed of active straightening. The strip of plaster corresponds to the grafts of the iliotibial bands.

Thomasen, Aarhus.

A SHORT SURVEY OF ORTHOPEDICAL SERVICE WITH THE NORWEGIAN FIELD HOSPITAL IN KOREA

by *E. Sandaa* (Oslo)

CUNEIFORM OSTEOTOMY

by *I. Alvik* (Oslo)

Osteotomy has sometimes produced less successful results partly owing to defective fixation and partly owing to the absence of, or poor ossification. Inadequate fixation too is often the cause of this lack of ossification while the ossification

moreover is dependent upon the contact between and the size of the osteotomy surfaces, the surfaces of contact.

The *V-shaped osteotomy* satisfies quite well the need for good fixation, good contact and large surfaces of contact, when the longitudinal axis of the bone must not be altered. Fig. 1. If the pointed bone-end of the osteotomy is made rather longer than the V-shaped (Fig. 2) good impacting into the metaphyses and other cancellous bone is achieved in this way too.

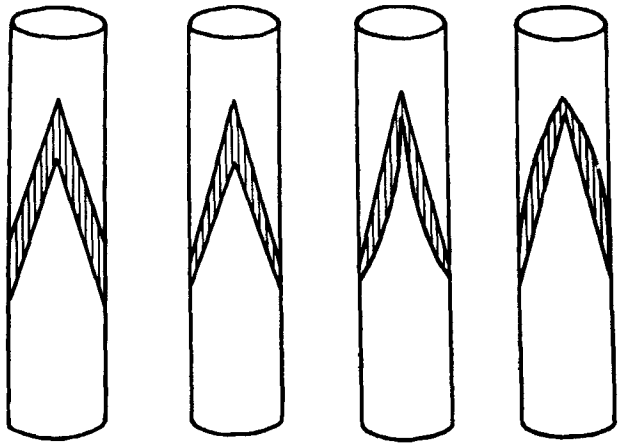

Fig. 1 Fig. 2 Fig. 3 Fig. 4

There are however only a few osteotomies in which the longitudinal axis of the bone can be preserved without alteration and these are mainly osteotomies for the purpose of shortening. Most osteotomies are angled to a greater or lesser degree and then the V-shaped osteotomy does not result in such good contact and impacting owing to the cylindrical shape of the bone. Contact is now only effected at the mid part of the osteotomy site and the area of contact diminishes as the osteotomy angle increases. (Osteotomy angle refers to the angle between the distal fragment and the original longitudinal axis of the bone).

This can be avoided by altering the borders of the pointed bone-end so that these have a concave outline at the osteotomy site, as shown in Fig. 3. The results are about the same if the sides of the V shape are curved, as seen in fig. 4. The pointed end will then wedge itself into the cancellous part of the forkshaped opposite bone and the side of the pointed fragment will obtain contact with the sides belonging to the other one so that pointed end will lie on the inner portion and the lower part will lie along the outer portion. The curve must be formed in accordance with the size of the osteotomy angle and the curve is increased as the osteotomy angle increases. If the osteotomy angle is to be especially large, the curve must be set on the V shape and when the osteotomy angle approaches a right angle, the curve of the V-shaped end must approach a half circle.

In order to maintain the wedge and this position and to improve the fixation still further, a strong vitallium plate is firmly fixed with the aid of screws passing through the corticalis opposite. The patient can be treated post-operatively without plaster or other fixation splints. Exercises and the maximum of movement in bed can then be commenced during the first days after operation and thus functional

treatment obtains the best conditions so that limitation of joint function and muscle atrophy with insufficiency of the mobility mechanism can be avoided. Weight-bearing, however, must usually not be allowed before osseous union is assignable.

In the course of the last two years many of the osteotomies undertaken at the Clinic for Cripples, Sophies Minde, have been performed according to the technique described above, and post-operative functional treatment was given without plaster. The results have been very satisfactory; good function of the limb operated on was achieved at an early stage. Delayed ossification and pseudarthrosis have not appeared. Most osteotomies which are performed according to this method are subtrochanteric and supracondylar osteotomies of the femur and osteotomies of the tibia.

SUMMARY

As the result of suitably curving the borders of the bone the V-shaped osteotomy can be adjusted in such a way that both contact and impacting are satisfactory even if the osteotomy angle is rather large. Moreover the position and the impacting are maintained by the aid of a vitallium plate without the employment of plaster or any other fixation splints. Functional treatment with the maximum of movement but without weight-bearing can then be pursued in bed from the first days after operation; thus limitation of the joint function and muscle atrophy can be avoided.

DISCUSSION:
Novotny, Oslo.

TRANSPOSITION OF THE ILEOPSOAS WITH OPERATIVE REDUCTION OF CONGENITAL HIP DISLOCATION

by *F. Langenskiöld* (Helsingfors)

The account is based on the experience gained from 80 transpositions of the ileopsoas. The author of the paper had "found the transplantation of the ileopsoas to be an advance in selected cases".

(The paper is published in detail pp. 295–299).

LUXATIO COXAE CONGENITA (A FOLLOW-UP STUDY OF 406 CLOSED REDUCTIONS)

by *E. Platou* (Oslo)

The author reports on 277 children with 406 luxated hip joints, treated with closed reduction and systematic subsequent treatment under his personal control during the period 1934–1947. The reduced hip joints were kept relieved for 7 months, 5 of them in plaster in 3 stages.

The results are compiled according to the system of Severin and Ponseti.

The primary result. (status at discharge):

Roentgenologically good result:

Group I, II, III ..... 371 hip joints: 91.4 %

On check-up examination 3–16 years after reduction the material is divided into 2 groups:

Late functional result and *Roentgenological result.*

Functionally good (A, B, C) ..... 328 hip joints: 80.8 %
Roentgenologically good (I, II, III) 268 hip joints: 66 %

Anatomically cured:

Unilateral luxation ..... 21 hip joints: 14.2 %
Bilateral luxation ..... 31 hip joints: 14.7 %

The author has attempted to find a basis for the prognosis at the beginning of treatment and has arrived at the following results:

The earlier the child is treated, the better.

If the *bone nucleus* in the femoral head is normal before treatment, the prognosis is somewhat better than if it is pathological.

The acetabular angle: Even a very steep acetabular roof–40°–or more–has little significance.

The degree of dislocation: The more extreme dislocations yield a somewhat poorer result on the average.

Reduction trauma: is undoubtedly significant. A difficult reduction leads to increased trauma and yields a poorer result than an easy reduction.

DISCUSSION:

Novotny, (Oslo): In connection with the treatment of congenital dislocation of the hip I would like to stress the importance of semimobile treatment. Spitzy, for example, has always used rather wide plaster of Paris bandages. One reason for this was that he thought rigid immobilization to be especially unphysiological in small children.

In 1930 I myself had the opportunity to examine the X-ray pictures of about 250 cases of congenital dislocation of the hip, treated at his hospital. About 20 % had already developed osteochondrotic changes (Perthes-Calvé-Legg) of the femoral head during the period of immobilization in plaster of Paris. The percentage was about the same for different primary positions (from external to internal rotation). Quite a number of these had been very cautiously reduced and had been easily reducable. From this observation it seemed probable that immobilization with its resultant constant pressure on one and the same segment of the femoral head and possibly permanent tension of one and the same part of the capsule of the hipjoint is an important factor in producing the osteo-arthrotic changes. I used therefore in later years a plaster of Paris bandage, which allowed some rotational movement at the hip and which had the form of a wide bell over the leg. In 1934 I saw Bauer's method of using a rod-bandage and examined the X-ray pictures of about 40 of his patients, which showed much better results than those I had seen before. Since 1935 I myself have used a splint which is a simplified version of Higenreiner's splint. It can be very easily made by the surgeon himself. I use narrow ladderwire splints (Cramer) for it. This splint has the further advantage that the child is able to crawl while wearing it. (Demonstration of the splint and of the X-ray pictures of a case treated by this method).

Dennis-Brown has even gone further than that as he uses splints in which the children are able to walk with abducted hips. In this way he tries to heal the deformity and to develop the hypoplastic hip by as much function as possible.

Langenskiöld, Helsingfors, *Lindström*, Härnösand, *Platou*, Oslo.

HIP ARTHROPLASTY WITH ACRYLIC PROSTHESES

by *S. Kiaer* (Copenhagen)

The series presented at the 5th S.I.C.O.T. Congress in May' 51 (Acta Orth.) was followed up 1 year later. New material has since been added to this: 50 patients operated on between Jan. 51 and Jan. 52.

Author's technique: Gibson's incision is employed as the standard incision although the first 15 patients were operated on via Hueter's incision. Acrylic cement is introduced as a routine fixation for the prosthesis since better support and good filling of the bone defects are obtained with this. The Judet prosthesis is altered somewhat; sometimes the point is strengthened with more solid masses of acrylic cement in order to avoid the fractures under observation, sometimes a special type is used with a colla where shortening of the collum is found. In such a case the operation is performed on the lines of Bracket's operation. Considerable emphasis is placed on lengthy, painstaking physiotherapy and after-treatment. As a rule the patients begin exercising in bed 4–5 days after the operation, leave their beds 4 weeks after operation.

Results: 6 patients were operated on in 1947 according to a special technique taking a mold and later inserting a specially made prosthesis: 3 poor and 3 good results. The 3 good cases exhibit the longest observation period in our series–and the acrylic substance seems to have withstood the lengthy weight–bearing well. The oldest material mentioned, on which the Judet technique was employed, showed no obvious change on renewed examination 1 year later (average observation period 12 and 23 mths): 33 excellent, 6 good, 4 rather good, 1 poor. The new series comprises 50 patients (53 joints): out of 51 painful hip joints 47 became free of pain.

Out of 50 hips with reduced mobility 34 improved, 13 remained unchanged, 3 became worse. Trendelenburg's sign was positive in 28 prior to operation, 15 of these became negative. Excision of the joint capsule seems to have no significance. Out of 13 patients who retained the capsule 9 became free of pain, out of 40 who had the capsule removed 28 obtained pain-free hips.

Complications: 8 cases of thrombosis: 3-shifting of the prosthesis (Fracture of the acrylic nail): 1 case of infection. The prosthesis was replaced in 5 cases. Secondary operations took an uncomplicated course. Shifting of the prosthesis has not been observed among the prostheses fixed with cement.

PRELIMINARY EXPERIENCE OF PLASTIC PROSTHESES OF THE HIP JOINT

by *S. Friberg* (Stockholm)

HIP ARTHROPLASTY WITH VITALLIUM CUP. DEMONSTRATION OF PATIENTS

by *Arnt Jakobsen* (Oslo)

TREATMENT OF PSEUDARTHROSIS COLLI FEMORIS BY ARTHROPLASTY

by *K. Jansen* (Copenhagen)

The Judet acrylic arthroplasty has been employed for the last three years in the treatment of pseudarthrosis colli femoris. Owing to the frequently considerable degree of bone resorption the technique must often be altered in accordance with Brackett's method and acrylic cement has been an indispensable aid.

18 patients with pseudarthrosis colli femoris or caput necrosis were operated on.

The age of the patients varied between 27 and 73 years, the majority being between 50 and 70 years. Earlier treatment comprised osteosyntheses (Sven Johansson) osteoplastics etc. In 11 cases a typical Judet could be performed, in 7 cases a Judet-Brackett. In 3 cases dislocation of the prosthesis occurred a few days after the operation. This was easily reduced–and the end result was not changed by the reduction. In two patients a fissure appeared in the collum during the placing of the prosthesis. This had no effect on the result.

For 12 patients who had been observed for over half a year the result was satisfactory. 8 had excellent results, with free mobility and full stability as well as a good gait; 4 were considerably improved, but a slight Trendelenburg sign or limitation of mobility remained.

Freedom from pain was general for all those operated on. The after-case was much easier than after an operation for osteoarthritis.

Finally the report mentions two patients operated on shortly after trauma involving dislocation fractures of the caput femoris. Both were out of bed after 4 weeks and discharged after 6–10 weeks. They now walk freely, move freely and have no pain (9 mths post-operatively).

DISCUSSION:

Støren, (Stavern): Since 1947 we have employed the vitallium cup in 57 out of 65 hip arthroplasties at the Coast Hospital in Stavern. In a considerable number of these cases the plastic cup could not be replaced by caput prosthesis: (Fig. 1 + 2, Fig. 6 +7).

In these cases, particularly as far as the luxations and subluxations are concerned, it is not the caput which is of most importance but the restoration of a

	Total no.	Considerably improved	Improved	No change	Worse	Observation period under 1 year
1. Osteochondrodysplasia with caput deformity	2	2				
2. Luxations + severer subluxations	18	6	6	1*	?	7
3. Subluxations	11	2	5		?	4
4. Fractura colli femoris with pseudoarthrosis and caput necrosis	2	1	1			
5.						
6. Coxa vara epiphysiolyt. without mobility	1	1				
7. Coxa vara secondary arthrosis	2	1	1			
8. Pure arthrosis	17	6	4		?	7
Total	57	20	18	1*		18

* To be re-operated on.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

new and sufficiently deep acetabulum on the correct site. This will be seen from the rtg. pictures which I shall show here.

The patients have been very pleased on the whole. But at the objective follow-up I personally had several disappointments in cases where I had least expected them. There was a partial falling-off in mobility owing to new bone formation around the cup. In some cases of subluxations, in spite of a deep acetabulum, right inside the pelvis the cup exhibited a tendency to work its way out as time passed. Demonstration by rtg. pictures.

Conditions on which we operated were as follows:

A. Degenerative conditions and deformities after osteochondrodysplasia.

Fig. 1. Rtg. Elsa F. Before operation she was almost rigid in both hip joints. She had back pain owing to contracture in the hip joints resulting in a forced

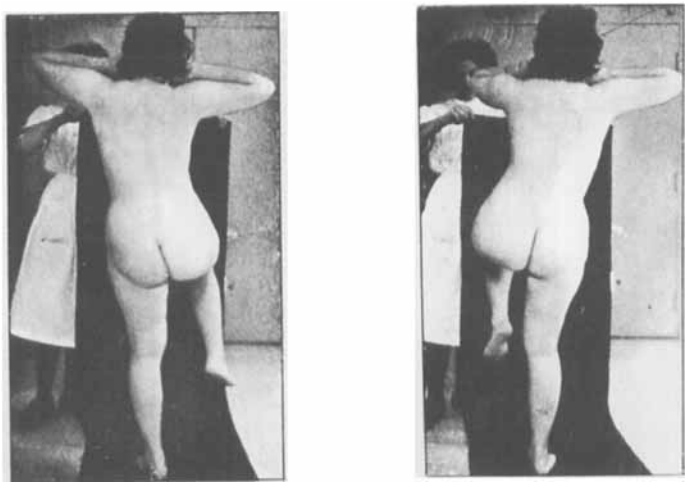

Fig. 5.

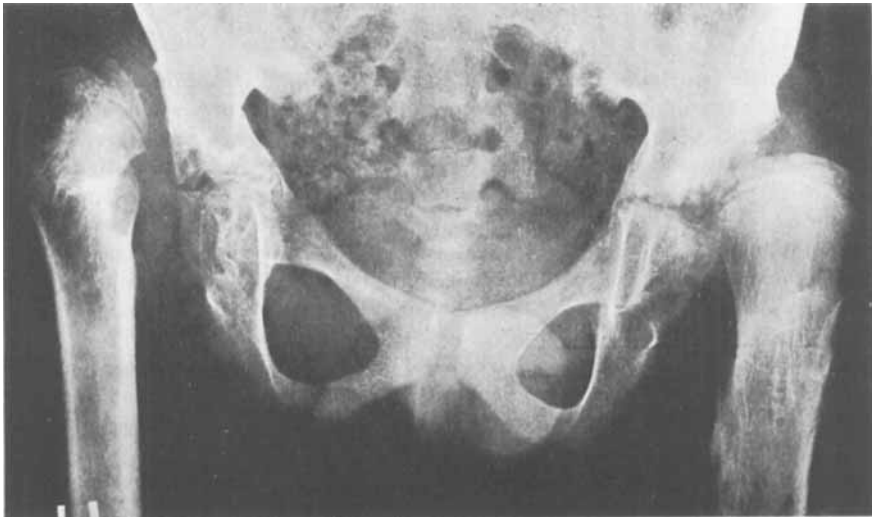

Fig. 6.

lordosis of the lumbar column. On the right the plan of the operation is indicated. The major and minor trochanters are moved distally and the caput is formed by the collum and trochanter. Fig. 2. Three years after the operation, good mobility and freedom from pain. This patient is included under the leading–considerably improved.

B. *Luxations and subluxations.*

Case 7 is an example illustrating how important it is from the point of view of stability that the acetabulum is re-constructed on the site of the old acetabulum. This is a 16 year old girl with bilateral luxatio coxae. Her hips were fixed in extension and maximum external rotation and were dislocated upwards 5 cm. There

Fig. 7.

was complete atrophy of the caput and collum. The old acetabulum was completely obliterated. The patient was operated on, the trochanter major and minor being moved distally. The caput was shaped with the aid of the trochanter and the remainder of the collum. A deep acetabulum was constructed in the ilium on the site of the former one and extending upwards out of regard for the missing collum.

On the right side the Trendelenburg sign was negative after the operation, but on the left where the acetabulum was restored 1½ cms above the lower edge of the old one i.e. 1½ cms removal upward in relation to Schenton's line-Trendelenburg was positive. She has now very good mobility in both hips and in all directions.

In two cases of high luxations femoral pareses occurred and also anesthesia in the Saphenus-region. It does not seem, however, to be due to tension of the nerve but to the pressure of the elevator on the lower section of the psoas and thus on the nerve.

The old acetabulum lies very deep here. If it had been caused by tension one would also have expected pareses to appear in the sciatic regions and this has not happened.

Case 10. Lux. coxæ fig. 3.

In spite of the deep acetabulum (fig. 4) and negative Trendelenburg sign (fig. 5), in spite of good mobility, adduction and freedom from pain, the patient still limps after one year (Is the cup too big in relation to the caput?)

This patient is placed under the heading: improved.

Case 14. High luxation. After operation–good mobolity and stability (fig.6 + fig. 7).

C. Fracture of the femoral neck with caput necrosis. Here the caput prosthesis takes its rightful place and we have commenced doing this.

D. Pseudarthrosis colli femoris with considerable upwards dislocation and degenerated caput fixed in the acetabulum.

E. Coxa vara epiphysiolytica with absence of mobility.

F. Secondary osteoarthritis and apparent primary osteoarthritis.

In a number of the last-mentioned cases where the acetabulum is not too malformed or worn out, the caput prosthesis obviously has its' place but has not been employed by us.

Hip joint arthroplastics with vitallium prostheses, operated on at the Coast Hospital in Stavern 1947–52. Observation period 1–5 years[1].

Bertelsen, (Copenhagen): 90 hip arthroplasties have been performed in Department of 1 of the Orthopaedic Hospital in Copenhagen, one half in accordance with Smith-Petersen's technique, the other half following that of Judet. The preliminary results after a maximum of 4 and a minimum of 1½ years respectively are best in the Judet group. The results are judged by identical investigators and according to the same system (Merle d'Augibné).

Semb, Oslo.

Westerborn, (Gothenburg): A short review of my own experiences with about 120 cases of hip joint plastics. About 20 of these were carried out in accordance with Judet's technique and the remainder consist of cup-plastics (Smith-Petersen). As far as the latter are concerned experience shows that with careful selection of the cases the final result is very good. Judet's method has not yet been in use long enough for the final results to be judged with certainty. In certain cases e.g. those with a bad head or with pseudo-arthroses on the collum, compelling the removal of the head, Judet's method is certainly preferable. In my opinion the exclusive use of the one or the other method should be availed and a choice should be made from case to case. It is therefore important to be familiar with both methods of plastics.

Thomasen, Aarhus.

Støren: As will appear from my contribution to the discussion of Jacobsen's paper "Hip Joint Arthroplastics with Vitallium Prostheses", at the Coast Hospital of Stavern we have employed the arthroplasty technique with vitallium cup in two cases of pseudarthrosis colli femoris. In these two cases with high dislocation upwards collum resorption and caput necrosis were found. We moved the trochanter major and minor in a distal direction, constructed a new caput from the remains of the collum and the mid-section of the trochanter and built a new acetabulum with almost a vertical axis in order to prevent dislocation.

Freedom from pain, good mobility and good stability were achieved (Trendelenburg †). I do not believe that any other procedure would have given better results in these cases. (Rtg. pictures Fig. 1 + 2, p. 350).

Kiær, Copenhagen, *Friberg,* Stockholm, *Jakobsen,* Oslo, *Jansen,* Copenhagen.

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[1] Follow-up examinations were made by dr. I. Åxsæther according to the same principles as were employed for the follow-ups in A. Jacobsen's series.

Fig. 5. Right hip operated on: healthy left hip.

Fig. 1.

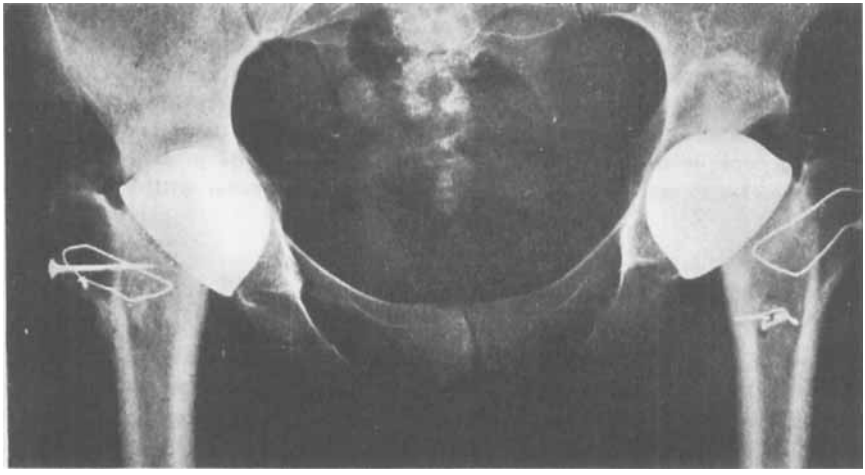

Fig. 2.

KNEE ARTHROPLASTY WITH ACRYLIC PROSTHESIS

by *S. Kiær* (Copenhagen)

A Preliminary report concerning knee arthroplasties and the implantation of acrylic protheses in the tibia after a minimal resection of the tibial condyles. 7 patients above the age of 60 were operated upon. The observation period has been too short, but the preliminary result is promising.

DEMONSTRATION OF 2 PATIENTS WITH KNEE ARTHROPLASTY

by *E. Platou* (Oslo)

DISCUSSION:

Støren: Speed has investigated a series of 194 knee joint arthroplasties–up to 22 and 26 years after operation–and believes that a stabilisation of the condition occurs after a number of resorptive changes of the joint ends during the first few years. Function will improve until 5–7 years have elapsed. Then a stationary condition is arrived at.

(Demonstration of patient operated on 8 years ago.)

I should like to point out that here the drawer sign is negative even though the lig. cruciata is missing.

In 1946 I demonstrated 4 knee joint arthroplasties at the Orthopedic Conference in Copenhagen. Nilsonne objected, with reference to the one who was 41 years old, that it was too late an age at which to undertake a knee joint arthroplasty. I can now announce that this patient shows one of the best results. (Unfortunately it turned out that she had gone to America when I tried to contact her in order to demonstrate.)

Friberg, Stockholm, *Sjövall,* Örebro, *Westerborn,* Gothenburg, *Jansen,* Copenhagen, *Kiær,* Copenhagen.

HEREDITARY IDIOPATHIC HYPOTONIC TYPE OF JOINT

by *N. Silfverskiöld* (Stockholm)

A hereditary idiopathic, hypotonic type of joint is described and shown to be fairly common. The joints most frequently affected are those of the feet, hands, knees and spinal column. The pathogenetic significance of this type of joint in the development of, *inter alia,* flat-foot, patellar dislocation and laxity of the spine is emphasized.

(The article is published in detail in the Nordisk Medicin 1952: 47: 823.)

ON THE OPERATIVE TREATMENT OF DUPUYTREN'S CONTRACTURE FOLLOWED BY A FILM

by *E. Moberg* (Gothenburg)

The following technique was gradually evolved after the trial of various methods in over four hundred operations done at the Hand Service of Sahlgrenska Hospital. Operation was seldom undertaken unless at least one finger had its power of extension reduced by five centimeters or more. I have observed almost every variant of this disease, mild cases with only knuckle pads over the proximal interphalangeal joint, others with the contracture located solely at the distal joint of the thumb, one case with an advanced contracture of only one finger in a 16 year old boy and severe cases in which several fingers were fixed with their tips touching the palm. From 1 to 17 grams of fibrous tissue were removed at operation.

On re-examination of cases in which median volar incisions had been employed, the results proved to be unfavourable, and I have completely abandoned the use of these incisions. As a rule I now use a transverse incision distally in the palm and a curved incision at the base of the thumb. The strip of skin lying between these incisions is then undermined. If a part of this skin bridge does not have a sufficient blood supply, it can be made to survive as a free graft. Lateral incisions are usually employed in the fingers. From the base of the palm the fibrous

tunnels containing the nerves and blood vessels are explored by a blunt probe and opened up without risk to nerves or vessels. Then the palmar aponeurosis is divided into four parts and can be easily excised. At the base of the fingers, dissection is often difficult for here the volar nerves and vessels are tightly enclosed in the hard fibrous tissue of the contracture.

Difficulties are often encountered in covering with skin. Free full thickness skin grafts do not withstand heavy work with the hands and a better skin covering is necessary. In a few cases of minor defects, Bruner's method of turning a dorsal flap over to the volar surface was employed. The dorsal gap was then covered by a free full thickness graft.

In severe contracture of the little finger, the proximal interphalangeal joints were sometimes fused in slight flexion after a wedge resection and shortening. Stability was obtained by a strong bone graft. Owing to the good power of flexion in the metacarpophalangeal joint, however, the little finger preserves a satisfactory working capacity. In very grave cases the little finger was sacrified and the dorsal skin including nerves and vessels was used to promote skin covering of the defect in the palm.

In the great majority of cases, however, good power of extension was obtained without these measures, since the skin and volar ligament could be gradually stretched after the operation.

Postoperatively the hand is immobilized in its functional position and a steel wool pressure bandage put on the palm.

Naturally an atraumatic technique is always used and work is carried out in a bloodless operative field. Sponging is done with gauze dampened with Ringer's solution, never with dry gauze, since this harms the tissues and causes unnecessary scar formation. After the operation careful observation must be kept so as to prevent the development of a shoulder-hand-finger syndrome with shoulder contracture, hand oedema and shortening of the ligaments.

Different stages in the operative procedure were illustrated by a colour film.

DISCUSSION:

Silfverskiöld, (Stockholm): In many cases the pathological changes involved in Dupuytren's contracture occur not only in the palmar fascia but also in the following tissues (amongst others): 1) in the septa extending dorsally from the metacarpal region of the fascia, 2) in the subcutaneous tissue and the skin, 3) in the perineurium of the volar nerves of the fingers.

To obtain the most lasting results the meticulous excision of all fibrosis is required. I recommend the following technical procedure:

Application of the Esmarch bandage. A longitudinal incision either one or several, is made on the volar surface. (It has been objected that a longitudinal incision causes recurrence owing to scar callus. This is not correct, unless a general tendency towards callus and cheloid formation exists and in such a case a transverse incision would produce the same effect.) The main incision must often be made from the carpus to the distal phalanx midway on the volar surface of the finger; this makes it possible to carry out the necessary excision in the simplest way. If the skin and the subcutis are thickened by fibrous tissue the part is excised by means of another longitudinal incision. Otherwise the condition may recur. At the least, all the pathologically changed parts of the fascia and the septa mentioned above are carefully excised; perhaps complete excision of all the fascia

may be performed. Technically this can be done quickly and easily, possibly with the assistance of further longitudinal incisions. If perineurial fibrosis exists (see above) the digital volar nerves in question are exposed subcutaneously from the incision midway. The excision of the perineurial fibrosis which may be considerable, takes much time, since the nerve itself is to be spared. In nearly all cases full passive mobility is now achieved. But not in all. Arthrogenous flexion contracture of the finger may be present, this concerns the fifth finger in particular. But do not allow this to result unnecessarily in amputation. The little finger can be flexed to such an extent that its nail lies against the volar surface. Extend the finger passively (lege artis) as far as possible, carry out an additional incision and make a skin flap as well as covering with Thierschgraft–or let the wound heal secondarily in the best corrected position obtainable. Thus the little finger is saved and to a large degree, possibly almost completely, its function as well.

The Esmarch bandage is removed. Application of compression momentarily on the wound surfaces. Complete arrest of bleeding. Meticulous suturing. Fixation in moderate overextension to dorsal Kramer splints.

After-treatment: Let the patient rest in bed for about 48 hours, then institute gentle, active flexion exercises for some minutes each day. On about the ninth day the last sutures are removed. A night splint (an ordinary glove with corset spring sewn on dorsally) must replace the Kramer splints. Follow-up examinations, glove and physiotherapy must continue as long as the risk of recurrence exists. The patient should carry on personally with the exercises.

Primary result: As a rule nearly full active mobility is achieved two weeks after operation.

Final result: Usually fine, soft and supple scars are to be observed and recovery of normal function. And in the severest cases? for example, the serious cases of the little finger? Answer: they require long after-treatment and are successful to a considerable degree, as far as is possible, I believe.

MYOSITIS OSSIFICANS AFTER WIDELY SPREAD PARESES

by *H. Nissen-Lie* (Oslo)

Roentgen photographs were shown and a report was made concerning two cases in which, after pareses in the hip region, a severe callus appeared in the musculature around the hip joints.

Case 1.

Boy, born in 1944. Was treated for tuberculous meningitis in 1946. In spite of severe pareses he was cured with the aid of streptomycin. Increasing contracture of the hip joint–more than 1 year later ankylosis was present with a right-angled flexion–abduction contracture. Roentgen examination revealed a severe ossification from the os ischii to the trochanter minor. The position was corrected by a subtrochanteric osteotomy. After this, mobility of the hip constantly increased; at the last check-up in 1951 there was 0–90 degrees flexion, free abduction and rotation. Roentgenexamination showed resorption of the ossification and good healing of the osteotomy.

Case 2.

Seaman, born in 1922. In August 1948 quadriplegia set in, allegedly after vaccination. 3–4 years later symmetrical quadriplegia was present, increasing distally. Both hip joints were ankylotic in extension. Roentgen examination showed severe ossification, on the anterior aspects of both hip joints, corresponding to m. ilio-

psoas, together with connected bone structure from the pelvis down to the trochanter minor. 19.2.52: resection of newly-formed bone in front of the right hip. 3.8.52: corresponding operation on the left hip. The patient now has a mobility of 0–90° in the right hip and 0–60° in the left hip.

Discussion.

Presumably the ossification can be explained as a traumatic myositis since the paretic hip muscles become damaged by strenuous passive movements and massage.

DISCUSSION:

F. Langenskiöld, Helsingfors.

EXPERIENCES OF PUTTI-PLATT'S METHOD FOR HABITUAL DISLOCATION OF THE SHOULDER

by *E. Severin* (Gothenburg)

The results of this method which consists of a ventral capsulorrhaphy and shortening of the subscapularis tendon, have been studied in 16 cases. The observation period was from ½–3 years. In 14 cases a rupture could be demonstrated in or by the labrum. In one of the other two cases it was not a question of a complete dislocation but of a voluntary ability to subluxate. This condition was not improved by the operation. In the other 15 cases where the dislocations were not complete, the post-operative results were good. Three of these patients felt unstable on forced elevation and outward rotation, but none of the 15 shoulder joints had re-dislocated. Functionally the limitation in outward rotation arising through the operation has no practical significance. The method is recommended.

(The paper will be published in detail in the Acta Orthopaedica Scandinavica).

DISCUSSION:

Jerre, Helsingborg.

THREE RATIONAL OPERATIVE TECHNIQUE FOR HALLUX VALGUS (800 CASES OPERATD ON)

by *H. Støren* (Stavern)

OSTEOCHONDRITIS DISSECANS TALI

by *L. Unander-Scharin* (Stockholm)

59 cases of osteochondritis dissecans tale have previously been published. At the orthopædic clinic of the Karolinska Institutet and at the surgical clinic of the Karolinska Sjukhuset we have brought together a series of 55 cases of o.d. tali, 51 of which have been followed up, 16 women and 39 men. The observation period was from 1 to 12 years. Five cases had o. d. in both tali. In 41 cases the change took place in the medial region of the trochlea tali, in 19 cases, in the lateral region. Discomfort arose as follows: 1) arthrosis pains (pain on weight-bearing and movement), 2) locking symptoms, 3) in patients formerly free from pain who had come to hospital owing to trouble after a fresh trauma and in whom the roentgen examination revealed o. d. tali of earlier date.

16 out of the 41 medial o. d. had no trauma, 11 had come to hospital owing to

a fresh trauma and in these cases X-ray examination showed o. d. of an earlier date; 14 had an old trauma. Only eight of these last 14 had fairly severe trauma, however. Seven of the medial o. d. were operated on and 34 were treated conservatively. Six of those operated on obtained freedom from pain. Only half of those treated conservatively were trouble-free.

All except one of the 19 lateral o. d. had trauma. In seven cases the patients came to the X-ray examination immediately after a severe trauma. X-rays showed tearing of the corticalis in the lateral region of the trochlea tali. On X-ray examination such examples of tearing exhibited during their later development the picture of o. d. at the same site.

Seven cases were operated on. Four of these obtained freedom from pain. 12 were conservatively treated, three obtained freedom from pain.

Summary:

1) Both etiologically and from the standpoint of treatment a difference seems to exist between medial and lateral o. d. in the trochlea tali.

2) The medial o. d. seem to possess atraumatic origin while the lateral o. d. seem to arise after a traumatic injury to the bone.

3) The pain is of the arthrosis type to an overwhelming degree, caused by irritation resulting from the degenerative process. If loose bodies are present, locking symptoms occur.

4) Cases of o. d. which are free from pain must not be operated upon. Cases with loose bodies and locking symptoms are to be operated on. Cases with trouble of rather long duration, in which necrosis is found at the X-ray examination are to be operated on. The lateral o. d. cases seem to suffer from more pronounced discomfort than medial cases and seem less often to heal spontaneously. Consequently operative treatment should be given in the great majority of early cases. The incidence of arthrosis deformans is strikingly large even in those cases where the trauma is of a slighter character. Thus this ought to argue in favour of earlier surgical treatment.

The paper will be published in a more detailed form in Acta orthopedica Scand.

SUBLUXATIO TARSO-METATARSEA

by *H. Novotny* (Oslo)

Six cases of partial subluxation in the tarso-metatarsal (Lisfranc's) joint are reported.

While the complete dislocation can be easily diagnosed, the partial derangement is often difficult to assess and is therefore quite often overlooked. The consequences for the patient are however rather bad if the damage is not treated properly at the earliest possible opportunity, just as if it was a complete dislocation.

In the literature the damage is seldom mentioned and little attention is paid to it. The consequences of overlooking it seem however serious enough to warrant exact description of clinical and radiological symptoms.

Subluxation may establish itself after a relatively slighter accident than complete luxation. Of the 6 patients, reported here, 4 twisted the foot during a fall on a staircase, one when riding a sledge and turning over, and one sustained it by direct force.

The main symptoms after the accident were complete functio læsa of the foot, great pain and very pronounced swelling at the dorsal part of the foot, which

were in contrast to the often rather small changes one could see in the X-ray pictures. Another characteristic feature was the extreme sensitiveness of the foot even to slight bilateral pressure or rotational passive movement in Lisfranc's joint.

After-examination of the patients showed that two of them who were not treated in time were unable to work for quite a long period. One had come too late for examination (6 weeks after the accident); the primary diagnosis of the other patient was simply a chip fracture of the second metatarsal bone and the subluxation was recognised only 4 weeks later. The first patient was unfit for work for almost a year, the second one for six months. But even after this time moderate pain and weakness of the foot remained in both.

One patient diagnosed at the first aid station, but treated elsewhere 10 days after the accident by reduction and plaster of Paris bandage still had moderate pain, but was able to work at an office 8 weeks after the accident. Radiological after-examination showed that reduction was not quite perfect. The other 3 patients diagnosed, reduced and immobilized immediately after the accident were free from pain and had regained full function 7 to 8 weeks after the accident. The patients started walking with the plaster of Paris bandage 1 week after the accident and kept it from 5 to 6 weeks. Finally a radiological sign is demonstrated, which indicates strongly the existence of even, small subluxations of the second metatarsal bone.