

SPONTANEOUS RUPTURE OF THE LONG TENDON OF
THE EXTENSOR POLLICIS LONGUS. TRANSPLANTA-
TION OF THE EXTENSOR INDICIS PROPRIUS.

BY

Dr. TORSTEN WADSTEIN

In several publications v. Stapelmohr has described in detail the rare injury known as late rupture of the tendon of the extensor pollicis longus (e.p.l.). In 1940 Stapelmohr had collected 148 cases, partly from literature partly his own. Of these 68 % were women, 32 % men. Stapelmohr has shown that above all it is women over 50 years of age who suffer from this injury. The late rupture appears in connection with a trauma in the wrist, not immediately but within a more or less short time after it. The interval between the primary trauma and the rupture, varies widely. The shortest interval observed is 2 to 3 days, the longest 7 years. But most of the ruptures appear within 8 weeks after the trauma. 119 of Stapelmohrs cases occurred within 8 weeks and 132 within 12 weeks after the primary trauma. Neither the nature of the trauma, nor the type of the injury caused by it has any noticeable influence on the genesis of the late rupture. This rupture may appear after bruises, distortions, fissures in the radius or wrist bones as well as after severe fractures of the radius with dislocations and consequent reposition. Thus it does not appear more often after severe injuries than after slight ones. The genesis is uncertain. What one certainly knows is that in most cases a trauma in the wrist has occurred whose connection with the rupture cannot be denied. But how the trauma or the injury caused by it gave rise to the rupture is very little known. The ailment is rare, both absolutely and in relation to other very common

injuries of the wrist. Stapelmohr observed 3 cases out of 1250 injuries of the wrist which were x-rayed at the Norrköping hospital during the years 1927—37, of which 1000 were fractures of the radius. Other authors give similar reports (Oppolzer: 2 cases out of 800 fractures of the radius, Moor: 3 cases out of 500 fractures of the radius. Nissen-Lie: 4 cases out of 292 ditto. Quoted from Stapelmohr).

I shall not here discuss all the theories which have attempted to explain the genesis of the late rupture. Stapelmohr analyzed them in detail in 1940. But if the trauma or its immediate sequences should be the only cause these ruptures ought to occur more frequently.

There are, however, cases described, where a rupture seems to have appeared spontaneously, i.e. without any preceding trauma. In some of the cases related by Stapelmohr this happened to two quite healthy people (A man 35 years old and a woman 29). In other cases there is reason to suppose that an earlier state of inflammation had played some part. Stapelmohr has himself observed a spontaneous rupture in a young man, who suffered from polyarthritides chron., in which case the genesis seems to have been a rheumatic inflammation in the tendon. Bonnet (cited by Stapelmohr) described two cases of spontaneous rupture ("quasi-spontanées"). A pathological-anatomical examination showed in one case nothing certain, in the other "une pseudo-inflammation amicrobienne".

It is probable that an inflammatory state of the tendon or eventually in the muscle can precede posttraumatic rupture. Oppolzer (cited by Stapelmohr) thinks that a tendinitis can precede a rupture. The same view is held by Kleinschmidt, who points out that after every fracture of the radius crepitations of the tendon of the e.p.l. can be heard, a sign of traumatic tendinitis. In 10 cases in Stapelmohr's collation a swelling and soreness along the tendon were visible some weeks before the rupture. Salzer is inclined to suspect in one posttraumatic case that the muscle itself was the seat of a rheumatic inflammation which may have been the cause of the rupture.

I myself not long ago observed and operated on a case of

spontaneous (not traumatic) rupture of the tendon of the e.p.l. probably with rheumatic basis. This operation was performed according to a method proposed by Stapelmohr. As a few months earlier I had performed an operation on a typical posttraumatic late rupture by the same method, I think a short description of this case may be of interest.

Case 1. (spontaneous rupture) H. L. Journal 136/46. Male: 37 years old. Farmer. Admitted to the hospital Jan. 15th 1946.

Anamnesis: Always perfectly healthy. Never had any pain in the joints.

Has never suffered any violence whatever against the left wrist. A couple of months before he entered the hospital he suffered from pain and a swelling round the left wrist. He recovered gradually. About three weeks before entering the hospital he noticed that he was unable to extend his left thumb. Very likely this happened quite suddenly. While working, he had taken off his glove and when he put it on again, he could not get his thumb into its place. He rules out most definitely any trauma against the wrist.

Status Jan. 15th 1946. Robust, athletic man. Healthy. Internal organs quite fit. S. R. 18 mm an hour (Jan. 30th 9 mm an hour). Wasserman's reaction: neg. Kahn, Müller and Meinecke neg. Left wrist and forearm: No signs of inflammation. No atrophy of the muscles. The reflexes normal.

Left thumb: 45° defect in extension of the end-joint of the thumb. The thumb hangs in the hand. The tendon of the e.p.l. does not appear in the "snuff-box". X-ray-examination of the skeleton of the hand displayed nothing extraordinary. An injury to the nerves has been surmised but does not seem probable, and the diagnosis had to be spontaneous rupture of the e.p.l., as the patient absolutely denies any trauma. As injury to the nerves was suspected, an examination by a nerve specialist was requested. His diagnosis was paresis of the e.p.l., possibly due to a neuritis.

Jan. 22nd Op. (the author): Transplantation of the extensor indicis proprius. Ether narcosis. A long incision from the base of the forefinger to the upperthird of the forearm. The third

dorsal space of the tendon is empty. Immediately distally from this is the distal stump of the ruptured endon of the e.p.l. This stump of the tendon is thickened and oedematous for a length of 1 cm. This stump is resected for pathological-anatomical examination. Then the deep layer of the extensors of the forearm is examined. Here the proximal stump of the tendon of the e.p.l. is to be found. It is considerably changed right up to the belly of the muscle: thick, oedematous and degenerated. This stump is removed in order to be examined. The belly of the muscle does not display anything abnormal. The rupture has obviously occurred in the third dorsal space of the tendon. As it seemed uncertain whether it was possible to get a tendon graft to heal into the belly of the muscle a transplantation of the tendon of the extensor indicis proprius was performed. This tendon is cut off at the base of the forefinger, drawn through the third space of the tendon and sutured on to the sound distal stump of the tendon of the e.p.l. They are sutured side to side. As the muscle belly of the e.p.l. may possibly be able to function it is anchored to the e.i.p. tendon. When this tendon was laid bare, there was found on the back of the hand a bit of metal, the size of a grain of rice, which certainly had not affected the rupture. The patient was quite sure that he had not got it into his hand during the last 6 months. Plaster of Paris for three weeks.

Jan. 31st. Satisfactory improvement. When the patient extends his forefinger, the thumb automatically makes the same movement.

Febr. 15th. The plaster is taken away. Healed per primam. The patient can extend the interphalangeal joints of both thumb and forefinger.

Febr. 23rd. Complete extension of all the joints of thumb and forefinger. The thumb can be put against all the fingertips.

The result of the pathological-anatomical examination of the ruptured tendon: Chronic tendinitis. In the middle of the tendon as well as on its outer part nests of granuloma. There are no certain signs of anything extraordinary but rheumatic granuloma may be surmised.

March 3rd. The patient has now practically full mobility of the thumb in all directions. Also the circumduction of the thumb is normal. The function appears to be completely restored, 100 %. Only the strength is still reduced.

It is evident that in this case an inflammation had preceded the rupture. The nature of the inflammation is not certain but the diagnosis of the pathologist, viz. rheumatic affection must be accepted. It may seem surprising that a man quite healthy in other respects should get a rheumatic affection only in this part of his body. Moreover it is noteworthy that the proximal stump of the tendon displayed such pronounced changes right up to the muscle belly. The distal stump of the tendon was clubwise enlarged and was oedematous at the length of 1 cm. from the place of the rupture but otherwise normal. The same observation was made in the second case: a stump of the tendon, very much changed right up to the apparently normal muscle belly, but a normal peripheral tendon-stump. Whether these changes are due to the rupture or primary and partly the cause of it is difficult to decide. In the first case the inflammation with its changes in the tendon seems to be the primary cause, which is verified by the clinical course and the histological examination. As regards the second case the latter gives no positive information and this also applies to tendons, which were examined earlier. Unfortunately no proof was taken from the muscle, which appeared normal in both cases. Certain changes may surely arise in the tendon exclusively due to rupture. Bunnell says that a tendon graft like tendon stumps, which have been sutured, change considerably during the first three weeks displaying oedema and necrosis and does not assume a normal appearance until after three months.

The diagnosis of late rupture is easy but mistakes have often been made. These can be explained partly from the fact that the trauma is of such old standing that one does not think of a traumatic injury. One's thoughts have turned to an injury to the nerve of some kind, isolated paresis of the e.p.l. or a neuritis. The author himself made such a mistake in one case. The person in question was afterwards operated on by Stapelmohr and

the case was published by him in 1942. Stapelmohr holds that isolated paresis of the e.p.l., eventually due to a neuritis, is very rare if indeed it ever occurs. In my first case, when the diagnosis of rupture was deemed correct, a neurological examination by an expert was requested. He arrived at the diagnosis paresis of the e.p.l., probably due to a neuritis. It is evident that such an erroneous diagnosis leads to wrong treatment.

Case 2. (posttraumatic late rupture) A. A. Journal 2435/45. Male. 35 years old. Electrician.

Anamnesis: Formerly healthy. On July 27th 1945 he fell from his cycle and knocked his left thumb, which became very much swollen. When after a couple of weeks the swelling subsided, the patient noticed that he could not extend his thumb as before. He does not know if he was able to extend his thumb immediately after the accident. On Aug. 14th he was examined at the polyclinic. On the operation the operating surgeon found at the "snuff-box" a slack tendon belonging to the e.p.l. Tenoraphi was then performed. Plaster of Paris up to Aug. 28th. Then the patient was allowed to move the thumb and use it in easy work. He did not notice any reduction of his power of extending his thumb. On Sept. 9th he was busy winding thread round electric motors, which is easy work. While working, there was such a loud cracking in his left wrist that a mate of his, who was standing one meter from him, heard the crack. Immediately afterwards the wrist was aching and during the following days there was swelling and soreness. He could not move the wrist. Compresses were applied and after a few weeks when the swelling went down he observed that he could not extend his thumb. He was admitted to the hospital on Oct. 5th.

Status: Healthy man. Internal organs quite fit.

Left wrist: Healed scar at the "snuff-box". Not able to extend the metacarpophal. and interphal. joints of the thumb.

The e.l.p.-tendon is diffusely swollen at the "snuff-box". It does not tighten, when it is stretched. The patient evidently suffers from a rupture of the e.p.l. Whether this rupture is high or low can not with certainty be decided. Probably it is high.

Oct. 6th. Op. (The author): Transplantation of the extensor indicis proprius. Ether narcosis. Long incision from the base of the thumb as far as the middle of the forearm. At the base of the thumb the distal stump of the ruptured tendon of the e.p.l. is seen. It continues upwards into a swardy tissue, which at first sight seems to be a tendon, although this, proves wrong. Then the deep layer of the extensors is laid bare and there is the e.p.l. It has a normal appearance but turns into an oedematous tendon, considerably thickened. It is laid bare downwards to the third space of the tendon and there the stump of the tendon is to be seen. On account of the condition of the tendon, the latter cannot be used for direct suture. Moreover it was impossible because of the retraction. The tendon is extirpated and histologically examined. The tendon of the extensor indicis proprius is laid bare and is split at the base of the forefinger. Afterwards it is drawn through the third space of the tendon and by the Lexer's method is sutured, the shape of a fork, to the distal end of the e.p.l. The transplanted tendon thus takes the same position as the e.p.l. As this muscle looks normal, it is sewn on to the tendon of the e.i.p. so that it may grow into it and be able to function. Plaster of Paris for 5 weeks.

An x-ray examination of the thumb and the skeleton of the hand did not show any changes.

The result of the pathological-anatomical examination of the tendon: considerable changes in the form of vascularization with the vessels surrounded by formations of fresh connective tissue. In some of these formations there is plenty of haemosiderine, residues of old bleedings. No necrosis is visible. Satisfactory improvement: Healed per primam. Mobility was improving very slowly.

On Febr. 22nd 1946 the following was noted: Extends the interphal. joint completely. The range of circumduction of the left thumb about $\frac{2}{3}$ of that of the right. Mobility of the left thumb on the whole about 90 % of that of the right.

This case is interesting from several points of view. It is possible that the original trauma brought about a high rupture of the e.p.l. The slack tendon, which was shortened by raphi

at the first operation points to that, although there was no sign of healed rupture at the second operation. Stapelmohr draws a distinction between high and low ruptures of the e.p.l., the latter extremely rare. Only 10 cases are known.

Stapelmohr has described cases, in which in his opinion a high rupture has been cause of a slack tendon of the extensor. A raphi of the tendon has given good results. That seems to be the case with the man in question: The tendon of the e.p.l. functioned after the first operation. The rupture, late and certain in this case, is very characteristic. When the patient was busy at ordinary easy work, the winding of electric motors, the tendon broke with a crack, which was heard by a by-stander. At this moment a typical low rupture occurred.

In both cases the operation was performed according to a method which has been introduced into Sweden by Stapelmohr (earlier practised by Bunnel). Stapelmohr has emphasized the advantage of using a muscle for transplantation which has the same function as the e.p.l., viz. the power to extend by itself one finger. The only muscle to be taken into consideration is then the e.i.p. unless the rare extensor communis profundus pollicis et indicis is present. In both the cases related above the e.i.p. has been transplanted through the third dorsal space of the tendon to the distal stump of the e.p.l. In the first case suture in the shape of a fork according to Lexer's method, in the second case side to side. In the first case the result was perfect after six weeks, in the second very satisfactory.

SUMMARY

The author gives an account of a case of spontaneous rupture of the extensor pollicis longus, probably due to rheumatic inflammation of the tendon. This case as well as a case of so-called late rupture underwent operation according to a method proposed by Stapelmohr (Bunnel). According to this method the extensor indicis proprius is transplanted to the distal stump of the extensor pollicis longus. The advantages

of the method are discussed. In the first case the method had a perfect result, in the second a very satisfactory one.

ZUSAMMENFASSUNG

Der Autor berichtet über einen Fall von spontaner Ruptur von Extensor pollicis longus, vermutlich infolge rheumatischer Entzündung der Sehne. Dieser Fall wie auch ein Fall sogenannter Spätruptur wurde einer Operation nach einer von Stapelmohr (Bunnel) vorgeschlagenen Methode unterzogen. Diese Methode besteht darin, dass Extensor indicis proprius auf den distalen Stumpf von Extensor pollicis longus verpflanzt wird. Die Vorzüge der Methode werden erörtert. Im ersten Falle hatte die Methode vollen Erfolg, im zweiten einen recht befriedigenden.

RÉSUMÉ

L'auteur rend compte d'un cas de rupture spontanée de l'extenseur long du pouce, vraisemblablement causée par une inflammation rhumatismale du tendon. Ce cas, ainsi qu'un autre cas de ce genre qu'on appelle rupture tardive (Spätruptur), a été opéré selon la méthode proposée par Stapelmohr (Bunnel). Cette méthode consiste en transplantation du tendon de l'extenseur propre du doigt indicateur au bout périphérique de l'extenseur long du pouce. L'auteur discute les avantages de la méthode, qui a donné un résultat très excellent dans le premier cas et un résultat tout à fait satisfaisant dans l'autre.

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