

## Dupuytren's Disease and Finger Contractures

Although the cause of Dupuytren's disease is still unknown, we do know that the condition is hereditary. Joint research on the genetic roots of the illness by the Universities of Cologne in Germany and Groningen in the Netherlands, has been able to determine the chromosome which holds the information on this disorder.

To date, no significant influence of risk factors such as diabetes mellitus, alcohol or smoking has been established in the genetic material (1).

Over the course of months or years, nodules or cords are formed continuously or in surges in the palm and / or fingers. The fingers affected begin to contract noticeably and complete stretching at the base and middle joints becomes no longer possible. The severity of the contractures increases, potentially leading to a condition in which the fingertips make contact with the palm and become locked in this position.

As the condition develops not only do the fingers become increasingly disabled, they can also become a hinderance in certain situations, such as at work, during sport, with regard to personal hygiene or when playing a musical instrument.

From 1994 until June 2018, I carried out a minimal invasive corrective measure under local anesthetic on over 4000 outpatients. The Percutaneous Needle Fasciotomy (PNF). This treatment has not only been seen to deliver equally good results as open surgery, but further:

1. Reduces healing time to a few days instead of weeks or months as is common with open surgery
2. Reduces the danger of postoperative bleeding and wound healing disorders as may be incurred with incisions from open surgery.
3. Avoids uncomfortable and potentially painful dressing changes.
4. Accelerates recovery. Full functionality of the hand is regained much quicker than after open surgery.
5. Enables a repeated treatment by PNF, as is deemed necessary. Each additional treatment is as straightforward as the original. In contrast, open surgery leads not only to surface scars from the incision but also to scarring deep down in the tissue. This scarring makes each additional hand operation technically more difficult, and more prone to complication and pain.

Disadvantage of Needle Fasciotomy:

The recurrence rate, i.e. a repeated contracture of the fingers, is higher than after open surgery with its skin incisions (2).

Summing up, the advantages of the PNF are that it is minimal invasive and easily repeatable. Treatment as an outpatient and the reduction of time unfit for work are important socio- economic factors, which also need to be considered.

Even now, after 24 years of using PNF, patients still ask me why this method is not universally known and practised.

1. A stay in hospital is unnecessary as needle fasciotomy is an outpatient treatment. Surgical procedures which are thus carried out are substantially poorly remunerated by the medical insurance companies. For the patients it is an advantage that a stay in hospital is avoided. But because of the shift to outpatient treatment trainee assistant surgeons are not able to learn this technique. It is a catastrophe for the field of hand surgery that medical insurance dictates to the hospitals which operations are to be carried out at a reduced cost as an outpatient.
2. The needle fasciotomy (PNF) does not require any subsequent medical treatment. In the case of the extensive needle fasciotomy (PNF+) with skin transplant, it is usually just two changes of dressing that the local GP or surgeon can carry out. Thus the potential for revenue, particularly from private patients is diminished in comparison to open surgery with its incisions.

These are the main reasons why the breakthrough of needle fasciotomy has proceeded so sluggishly.

A surgeon can only master this technique through years of practice on numerous patients. There is no learning centre.

I myself know of only 5 surgeons in Germany who have practised the PNF for 10 years or more, but unfortunately they still revert to open surgery on some patients. For me, open surgery (the partial fasciectomy -PF) is a thing of the past.

Because of previous negative experience with Dupuytren's contracture and open surgery, many GPs are reluctant to send patients for surgery. They send patients much too late, only then when fingers are decidedly bent.

Needle fasciotomy is, however, best carried out when the fingers start to bend.

Before undergoing needle fasciotomy, patients must be informed that:

1. Under local anaesthesia, a needle is used to perforate the substantial cords and nodules fan-shaped and tangential to the skin's surface between skin and flexor tendon. Subsequently the contracture is broken open by passive stretching, ideally with an audible crack. This shocks some patients but there is no need for anxiety, nothing unforeseen has happened.
2. Contractures in the base finger joints (MCP- joints) can usually be completely released by PNF. Contractures in the middle joints of the fingers (PIP-joints) can be released although not always fully (incidentally neither can this be achieved by open surgery, because in the course of Dupuytren's disease so called secondary changes in the joint's capsule or the tendon system can develop for which there is no treatment which promises success).
3. If the finger is pronouncedly bent or has been bent for a long time, the skin may no longer be elastic enough or may have grown together with the underlying cords or nodules. It's then possible that the skin will tear in this position when the finger is passively stretched after the PNF. This is no cause for alarm. Small tears heal by themselves; tears larger than ca. 1cm are covered with a small piece of skin taken under anaesthesia from a hair-free position on the lower or upper arm.
4. In the case of a skin transplant, the fingers in question are placed in a 2- or 3-finger splint dressing for 10-12 days to enable healing whilst immobilised. If no skin transplant is necessary, the splint dressing may be removed on the day after the PNF. You are then able, if you wish, to play golf, tennis or work in the garden again.

With severe contractures, ergotherapy sessions should be a natural follow-up to the PNF.

5. The use of a comfortable dynamic traction splint, in the daytime for several hours at a time, is highly recommended. It should be used indefinitely to prevent a recurrence and to correct any residual contracture after PNF.

Because the available splints were too uncomfortable and showed no effect, a patient from Berlin who is badly affected by Dupuytren's disease developed such a splint after 1½ years meticulous work. (3). Unfortunately his splint is not yet in production and thus patients must try to prevent a renewed progression of finger contracture with the static or semi-dynamic splints currently available.

A lasting improvement of finger contractures with these splints is not possible.

The PNF is for me as a surgeon a considerable enhancement which alleviates my daily workload. Time and again, I am thrilled by this ingenious technique of straightening fingers which was developed and practised by the French 50 years ago. Patient satisfaction with this short surgical procedure, which apart from the local injections is essentially painless, is very high. Some are shocked when they hear sharp cracks during the procedure, but I explain to them beforehand that this comes from the fibrous cords and possibly the skin tearing. Vessels and nerves remain intact.

During the 90's, I discovered that spontaneous skin tears during the PNF were innocuous. I published this method which I termed the extensive needle fasciotomy, PNF+. Only with the PNF+ is it possible to correct severe finger contractures. The advent of the PNF+ made needle fasciotomy an alternative to open surgery, then now all Dupuytren patients, without exception, could be treated by this minimal invasive technique. A PNF+ treatment cannot be planned from the onset; it results out of a PNF when the skin is not elastic enough and badly scarred.

Sometimes after the fingers have been straightened, the base or middle finger joints in particular swell up and remain swollen for a time. Similar to a torn capsule injury sustained during sport.

Contractures in the middle joints of the fingers cannot always be completely corrected either by needle fasciotomy or open surgery. Nerves can be injured during a needle fasciotomy depending on whether they have

the normal anatomical spiral form, where the fibrous cords lie, and particularly then when the patient has previously undergone open surgery and the nerves are entangled amongst the scar tissue where the needle cannot deviate. This causes a sensory disorder usually in the fingertips for a short time, seldom a long time. With my technique, the flexor tendons are not punctured during the needle fasciotomy. If, however, the flexor tendons have become caught up in scarred tissue resulting from open surgery, they may tear when severe contractures are passively stretched. This has happened just once with my 4000 patients,

Before a needle fasciotomy, the following points are clarified by telephone or eMail:

Whether medication to thin the blood is taken. With just one exception, patients may continue to take their anti-coagulants. For Marcumar, the patient's GP must prescribe an alternative. So called "Bridging"

Patients who arrive by car must have a driver for the return journey.

A substantial breakfast or lunch is allowed.

Outdoor shoes must be left outside the treatment room. To avoid difficulty putting them back on after treatment, we suggest slip-on shoes should be worn.

After the needle fasciotomy:

The 2- or 3-finger splint dressing is to be worn for 1 day after the PNF and for 10-12 days after the PNF+.

After the PNF+ the dressing has to be changed twice by the local GP or surgeon. These dates are written down in a folder which the patient receives together with photographs before and after treatment, a flyer from the German Dupuytren Society and a special dressing for the GP if the patient has undergone a PNF+.

For insurance reasons patients must sign a written declaration which is printed in the appendix to this homepage.

Naturally this is no substitute for my face-to-face consultation in which I will answer all questions.

It is really quite unbelievable that contracted fingers can be straightened without even cutting the skin. In the 1990's many of my colleagues must have thought that I was some sort of wizard or miracle healer when their

patients told them that in Bielefeld treatment without skin incision was possible. I received many comments, some outrageous, from my ill-informed colleagues when patients told them they were going to Bielefeld to have their fingers straightened without open surgery. That was not always amusing, and there were only a few colleagues who were genuinely inquisitive and did not want to denounce me as a charlatan in front of their patients.

Even now it gives me great pleasure when a patient comes to me with contracted fingers and I say ,‘’ We’ll just straighten them out again’’. The times when patients shed tears of joy after a needle fasciotomy, which in a few minutes ended years of restricted movement, are long gone. These days people are much better informed about needle fasciotomy through the internet. They visit the patient forum of the German Dupuytren Society on [dupuytren-online.de](http://dupuytren-online.de) and select their doctor of trust. Well-informed patients come for treatment from all parts of Germany and even from abroad.

In future the treatment of Dupuytren’s disease does, however, not belong to needle fasciotomy, at least not to needle fasciotomy alone.

There is a realisation: the fibrous cords that cause the contracture can be stretched.

The future belongs to the comfortable dynamic finger splint developed by the patient from Berlin.

If this splint becomes commercially available sometime, it is possible that its regular daily use can straighten fingers starting to contract, so that surgical intervention is no longer necessary. In addition it is possible that it can correct residual contractures from needle fasciotomies.

On no account should hands affected by Dupuytren’s disease be cut open. Unfortunately I am still the only surgeon who advocates this opinion ( status June 2018). But then, I was alone once before with the needle fasciotomy.....

**The historical development of percutaneous needle fasciotomy (PNF) in treating Dupuytren’s disease.**

The first scientific accounts about Dupuytren's contracture were not from the Parisian surgeon Baron Guillaume Dupuytren (1777-1835) but from a student who made notes during lectures from the London surgeon Henry Cline Sr. (1750-1827). At a later point in time, but still before Dupuytren, Sir Astley Cooper (1768-1841) released a publication. Recently Felix Plater (1536-1614) from Basel has been named as the first author. The treatment described by the first London author in the 18th century was already minimal invasive. A drawing from Astley Cooper in an old dictionary of anatomy shows how a fibrous cord in the palm of the hand is severed by a small incision (fasciotomy). Back then the wound was not stitched but left open to heal (secondary wound closure). Incidentally, Henry Cline Sr. considered post-operative splinting a necessity. At the turn of the 20th century, the radical resection of the diseased tissue in the hand established itself as the therapy of choice. A slight variation of this method, the partial fasciectomy, is practised to the present day. The fibrous cords and nodules are revealed by zigzag incisions, dissected and removed from the neurovascular bundles.

In 1959 J. Vernon Luck depicted subcutaneous fasciotomy as an alternative method to open fasciectomy for treating Dupuytren's disease. Luck was, however, of the opinion that needle fasciotomy should not be used on the fingers (4).

The second half of the 20th century saw further developments and intensive use of the minimal invasive needle fasciotomy in France. In 1993 Jean-Francois Badois and his team documented the needle fasciotomy which, in their opinion, was only applicable in the early stages of contracture (5).

In Germany, the orthopaedist K. Groeben was the first to publicise the PNF in 1993 (6). K. Groeben saw the PNF as an alternative to an operation with the restriction that contractures in the middle joints (PIP-joints) could not be released by this method.

In 1997, looking back over the past 10 years, R.A. Duthie and R.B. Chesney saw the PNF as useful only for those patients who proved themselves unsuitable for the local radical fasciectomy (7).

In 1997 the PNF was for the first time described as the therapy of choice, in preference to the PF, by Jean-Luc Lermusiaux and his team (8). The authors were of the opinion that the PF should be reserved only for those patients who were dissatisfied with the outcome of a PNF. J.L. Lermusiaux also mentioned that a skin transplant could sink the recurrence rate.

In 1994, K. Groeben demonstrated the PNF during a visit to Bielefeld. For 10 years the PNF was conducted solely in Düsseldorf and Bielefeld. The German hand surgeons first learnt about the PNF during the DGH-Congress in Hamburg in 2008. Albrecht Meinel delivered a presentation with the title „The percutaneous needle fasciotomy in the treatment of Dupuytren’s disease - first experiences”.

More and more patients with increasingly severe contractures came to me, often after several previous operations. On no account did they want another operation. During the 1990’s I learnt that spontaneous skin tears which occur during the PNF are not a complication. Only the skin, scars and the fibrous cords tear; the more elastic neurovascular bundles remain intact. Larger tears do not require elaborate plastic correction and are easily repaired with a full-thickness skin transplant from the same arm (9,10,11). Since about the year 2000 I can, with the PNF and the PNF+, treat every contracture, including patients from previous open surgery who sometimes had such disfigured fingers that elsewhere amputation was planned. Such cases are of course difficult for me so that I am all the more pleased over the straightforward ones.

The patients sometimes find it difficult to believe how quickly and trouble-free success becomes apparent. This surgical activity gives me the greatest satisfaction, and patients become aware of this during the treatment.

Hands with Dupuytren’s disease should on no account be cut open anymore!

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