EXCERPTS from THESIS

By Dr. Jörg Harrer

„Treatment of Ingrown Toenails Using a New Conservative Method“

A Prospective study Comparing Brace Treatment with Emmert’s Procedure
1. General Introduction

Dr. Harrer describes in his work the treatment of ingrown toenails, a condition most commonly met within the area of minor surgery. Unfortunately, the condition is often considered trivial and inconsequential by doctors and health insurance companies, although it usually means considerable incapacitation and pain for the victim, lengthy periods off work and thus put considerable strain to the economy.

• Task

Dr. Harrer describes in his thesis the VHO-Osthold-Spange® (nowadays VHO-Osthold-Spange® perfect or VHO-Curanail™) – a conservative way to treat ingrown toenails (Unguis Incarnatus) in which a metal brace is applied to the nail – in comparison to the Emmert’s procedure, a surgical method. The comparison was made on two groups of patients.

2.1 Emmert’s procedure

Following disinfecting, ring block anaesthesia is given, a tourniquet is applied and the toe covered with a sterile drape. Using a pair of scissors, the nail is divided from the front edge to the proximal base and the ingrown portion of the nail lifted out of it’s bed. A wedge of exposed nail bed and the inflamed nail wall, together with granulation tissue is excised down to the bone. Proximally, the eponychium is incised into healthy tissue and the germinal matrix carefully removed using a scalpel and a sharp curette. A single suture is applied to the nail fold incision, the tourniquet removed and a pressure dressing is applied. The patient is sent home under the condition that for the next few days the foot has to rest in an elevated position.

2.2 Treatment using VHO-Osthold-Spange® (VHO-Curanail™)

2.2.1 Preparation of the wound

After disinfecting, the nail fold is foamed with hydrogen peroxide and tamponaded several times with gauze, which is removed afterwards, thus creating space for the insertion of the brace. Any lateral nail spikes are removed. If large portions of nail are removed or in the presence of substantial nail defects, an onychoplastic procedure (application of artificial nail mass) is carried out to re-construct the nail plate. Local anaesthesia is not required.
2.2.2 Application of the brace

1. The VHO-Curanail™ brace consists of three pieces, the pre-formed mini levers a, b and the loop c. The bulge between a and b are used as handle for the gentle application, whereas the loop c is used to secure the levers tightly to the nail.

2. The first lever is adjusted precisely to the form of the nail, applied, secured with instant glue and cut off.

3. The second lever is also adjusted and applied.
   - No glue is used!
   - It is not cut off!

4. Appropriate size loop is selected and laid around the small pieces of protruding wire (s-curves).

5. The winding tool is placed throughout the two eyes and moved into a vertical position.

6. The eyes of the loop will slide into the bulge of the tool. The winding tool is then carefully turned clockwise. The three parts of the VHO are firmly joined together.
All protruding pieces of the wire are trimmed as shortly as possible.

All sharp edges are covered with a thick drop of artificial nail.

If granulation tissue is present new tamponade must be applied.

A small handle, made out of the artificial nail with ridges down the side, enables the patient/therapist to gently lift the nail, allowing to put in tamponade.

**Example 1:** Application of the VHO-Curanail™ on an abnormally curved nail.

**Example 2:** Big toe with extensive hypergranulation tissue on both sides after the last treatment session.

### 2.2.3 Aftercare and further treatment

After application of the first brace, patients in whom inflammation and granulation persist are seen for further treatment (wound care, replacement of tamponade) every 2 to 3 days. Wherever necessary (e.g. loss of brace tension), a new brace is applied. The frequency of subsequent treatments is determined by the therapist – there may be intervals as long as several weeks, with the brace being left on the nail plate. Treatment is continued until the nail fold has adapted to the pressure of the nail edge. Patients are instructed to replace tamponade themselves at regular intervals (for up to 3 months after termination of treatment).
The study was carried out with a total of 41 patients, split into two groups. Group one (21 patients) was treated by a VHO-Therapist, group 2 (20 patients) was treated with the Emmert’s Procedure – a surgical intervention. The average age of the patients was 28 years for the brace group and 34 years for the Emmert’s group. The age distribution was comparable for both groups. The intensity of pain experienced was assessed on a linear pain analogue scale of 100mm. Prior to the treatment, the pain experienced in each of the groups was comparable, while the pain caused by the treatment was significantly lower in the VHO group (9.6 ± 12.7) than in the Emmert group (49.9 ± 31.7).

![Comparison of pain levels before and after treatment](image)

It must be noted, that the Emmert’s procedure was carried out under local anaesthesia and that 7 out of 20 patients had to take pain killers after the treatment.
In the VHO group no local anaesthesia was necessary and no pain killers were needed.

3. Duration of restrictions in the daily life

The pain caused by the surgery as well as the healing process of the wound cause enormous restrictions to the day to day life of the Emmert patients. These restrictions were compared to those, caused by the VHO treatment.

For this, patients have been asked, how many days after the begin of the treatment they have been able to wear normal shoes again, without pain worth mentioning.
The picture shows that 16 out of 21 VHO patients could wear normal shoes again on the day of the first treatment. In the Emmert group, only 2 people could wear normal shoes after three days, but none immediately. The average duration for all patients was 0.7 days for the VHO group and 19.4 days for the Emmert group.

4. Duration of treatment

To evaluate the duration of the treatment, the period of time between the first and the last treatment session was measured. All necessary visits at the doctor or in the clinic have been assessed, as well as all brace treatments and partial treatments from the VHO-Therapist. The assessment was carried out 6 – 12 months after the initial treatment and resulted in an average duration of 77 days for the VHO group and 25 days for the Emmert group. Remarkable however is the fact that the numbers of sessions was almost identical for both groups.

5. Recurrence rate

All 21 brace patients reported that the brace was not bothersome at all, performing their daily duties. By the end of the follow up period, 3 of the 20 Emmert’s patients had developed a recurrence, as had 4 of the 21 VHO patients. In addition one VHO patient was still receiving treatment at the end of the follow-up (after 216 days). All 3 Emmert patients, but only 3 of the 4 VHO patients with a recurrence required further treatment. Statistically, the difference in the recurrence rates between the two groups is insignificant.
6. Time off work

None of the VHO patients had to take time off work. Working patients in the Emmert group had an average of two weeks off work.

![Picture 3: Comparison days off work]

7. Estimated economical cost

The average cost of treatment per large toe was 65 Euro for the Emmert group and 290 Euro for the VHO group. With an average of two weeks off work in the Emmert group, however, approximately 1600 Euro had to be borne by the employer in form of personnel expenses. The estimated total cost in the case of working patients, therefore, was approximately 1890 Euro as compared to only 290 Euro for the VHO group.

8. Conclusion

In his thesis, Dr. Harrer concludes, that an ingrown toenail should first be treated by conservative means whenever possible. Results seem to indicate that the VHO-Osthold-Spange® (now VHO-Curanail™) is highly suitable even in the presence of inflammation or granulation tissue – findings which would usually be treated by surgery. The VHO therapy proved to be a painless form of treatment with relatively low recurrence rates.