The Podiatric Surgeon’s Field Guide

-notions on anatomy and surgery-

Written and Illustrated by
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To:

Pilar
To the reader:

As surgeons, we are, for a fleeting moment, interlopers in Mother Nature’s territory. She will tolerate our trespass as long as we play by her rules. She will even help by healing tissues that perhaps were not cut or handled as gently as possible; but, break one of her rules and she will become treacherous and unforgiving.

O. A. Mercado
Introduction

My live long love affair with anatomy began when I attended my first lecture with Dr. Lyle McCain, at the old Illinois College of Chiropody and Foot Surgery in Chicago (Now the Dr. William M. Scholl College of Podiatric Medicine at the Rosalind Franklin University of Medicine and Science).

At a time when there was no slick Power Point presentations or 3-D Computer Generated Images available; Dr. McCain, utilizing simple chalk drawings and a bag full of bones, managed to impart to his students an intimate knowledge of the anatomy of the lower extremity in general, and the foot in particular. He was one of the leading foot surgeons of the time and he imbued his students with a sense of anatomical practicality that prepared them well for their chosen profession.

Dr. Lyle McCain                                    The Illinois College Chiropody and Foot Surgery

Dr. McCain was, in my opinion, the best lower extremity anatomy teacher who ever taught the subject. He was tough, but fair. It was common knowledge in the profession, at the time, that the McCain students were better trained in anatomy and surgery than the graduates from any of the other Podiatric colleges.

Since I have always been able to draw, anatomy and anatomical illustrations became a perfect fit for me. In school, in the dissection room, during my residency and later, during all the years that I spent teaching, lecturing, doing surgery and training residents in the hospitals, I would utilize my time in between cases to do quick sketches and write notes (field notes, if you will). As the years passed, these notes and sketches were turned into numerous articles, books and teaching videos.

The idea for a podiatric field guide came about as a result of my involvement with the Pioneer Foot Research Society and their legendary seminars in Texoma (now held at Murray Lake, Oklahoma). The seasoned leadership of this group includes some of the legends of the podiatric profession; the likes of Drs., H. F. Brown III, Bill Bowdler, Harold Chapman, Coyle DeMoss, Jim Flynn, David Wade and many more.
I never gave lectures to the group, they were always discussions and interchanges of ideas; what worked, what did not work. Most importantly, all of us have a common love for the profession and an absolute dislike of BS.

This Field Guide, then, is my way of putting down on paper the practical little tricks that I have learned over the years, and some of my observations on anatomy and surgery; and sharing with you those procedures that have stood the test of time and are reliable. I trust that you find this information interesting and that it will make your job as a podiatric surgeon easier. This has been a fun book to write and illustrate and I hope that you enjoy it as much as I have putting it together.

Of course, in this age of instant messaging that we live in, you can send me any comments or questions to: oamercado@yahoo.com I promise that I will get back to you.
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Ingrown Toenail Primer

Ingrown toenail is perhaps the most common foot problem presentation in the Family Physician’s office, and certainly a very frequent presentation in the Podiatrist’s office. The condition is very painful and it is usually the result of improper cutting of the nail by the patient. Toenails grow at a much slower rate than finger nails. The nail plate grows in a forward direction, not side to side as the old wives tale will have you believe.

Because of the nail plate’s slow rate of growth, it is possible for an individual to cut the nail improperly and not experience any problems for days. As the nail plate grows frontward, the spicule left by the improper cutting of the nail will move ever-so-slowly into the nail lip. This will cause irritation to the surrounding tissues and, if left untreated, will result in an infection. Ingrown toenails problems typically become chronic and in time, the nail lip will become hypertrophic, painful and easily infected (Fig. 1).

![Figure 1. Typical ingrown toenail presentation](image)

Since ingrown toenails are usually prone to infection, they can result in very serious problems, particularly in the diabetic patient. In fact, many diabetic amputations have started as simple ingrown toenails that were neglected. For this reason it is very important to stress to the diabetic patient that they should not attempt to cut their own toe nails. This should be done by a properly trained health care professional.

**Treatment of Ingrown Toenails**

The typical ingrown toenail patient will present to the doctor’s office with swelling and infection on one or both of the nail borders. The treatment plan that we use in our clinics is as follows. First, it is important to give relief to the patient during the first visit. We accomplish this by removing the offending nail spicule and packing the nail groove with antibiotic ointment and cotton.
If necessary, we can block the toe utilizing one to one and a half c.c. of **1% plain lidocaine**. For the injection we use a 3 c.c. syringe with a 30 gauge 1 inch needle (available from Becton Dickinson & Co.). Here is how we do the block:

The great toe is held away from the second toe. The needle is quickly inserted at the base of the toe just medial to the tendon of extensor hallucis longus and a wheal is raised. The needle is slowly pushed plantarly, injecting a small amount of the anesthetic solution as the tissues are penetrated. One-half c.c. of the anesthetic is used to raise a wheal on the medioplantar aspect of the hallux (Fig. 2A).

The needle is withdrawn all the way and reinserted at the base of the hallux just lateral to the tendon of extensor hallucis longus. A wheal is raised and the needle is slowly pushed to the lateroplantar aspect of the toe where one-half c.c. of the anesthetic is used to raise a wheal (Fig. 2B). The needle is completely withdrawn, the block is complete.

If the infection is bad enough, an oral antibiotic drug will be prescribed. During the first visit it is important to tell the patient that ingrown toenails are essentially a **surgical problem** and that if their condition does not improve they will need surgical correction.

**Surgical Correction**

Before we can discuss any surgery for the correction of ingrown toenails we must first talk about the importance of the **nail matrix** and its anatomical location.

**The Nail Matrix**

The nail matrix is the germinating epithelium that forms the nail plate. It is microscopic in size and hard to visualize during surgery. Through clinical experience we have learned that unless the offending portion of the nail matrix is removed, recurrence of horny-like portions of nail is unavoidable.

Since the **success** or **failure** of any nail surgery operation depends on the complete removal of the portion of offending nail matrix, it will behoove us to review the location of the nail matrix as well as some of the surrounding anatomy.
Cadaveric Dissection

A sagittal section of the left great toe was obtained from a well preserved cadaver (Fig. 3A-B, 4A-B). This longitudinal section upon careful examination revealed that:

1. There is a definite attachment, or rather intimacy between the nail matrix, the phalanx, and the periosteum. This area of intimacy seems to fall at the base of the phalanx, specifically at the point where the phalanx slopes superiorly and proximally.

2. The summit of the phalangeal slope flattens out into a mesa, and runs proximally a few millimeters and becomes continuous with the articulating surface of the phalanx. On the mesa there is a groove running from medial to lateral which serves for the attachment of the extensor hallucis longus (Fig.3A-B, 4A-B, and 5).

Figure 3A. Note that nail descends down to the periosteum at the base of the phalanx.

Figure 4A.

Figure 3B. Anatomical structures seen in figure 3A.

Figure 4B. Anatomical structures seen in Fig. 4A.
An anatomical landmark for the attachment of the nail matrix along with some observations as to the dorsal anatomy of the distal phalanx was described. This landmark will prove to be of great clinical (specifically surgical) value if the surgeon remembers that:

1. The matrix lies at the exact point where the phalanx begins to slope proximally. This area is can be felt with the dissection blade during surgery.

2. The matrix extends farther medially and laterally than it is commonly imagined.

3. Since the matrix is microscopic in size it is essential, during surgery, to remove all the fibrotic tissue and periosteum down to bone to prevent recurrence.

**Winograd Onychoplasty**

**Dr. A. M. Winograd** first described his technique for the correction of ingrown toenail in 1929. The procedure is simple to perform and gives such consistently excellent results that it has become the **Gold Standard** for the surgical treatment of ingrown toenails.
**Technique**
A cut is started on the nail plate with an English nail splitter or a bone forceps.

![Figure 6A.](image)

A No. 10 blade is placed on the groove made by the forceps and an incision is made deep to the bone one centimeter past, proximal to, the eponychium.

![Figure 6B.](image)

A second incision, semi-elliptical in shape, is made joining the two ends of the first incision (Fig. 6B). Here it is important to use a sawing (up and down) motion when cutting through the **hypertrophic tissues**. The hypertrophic nail lip has varying thickness and density and the sawing motion of the blade will insure an even cut and prevent accidental slipping and cutting of good tissues.

The two incisions are deepened with a No. 15 blade to the bone and the hypertrophic nail lip and offending nail plate are resected (Fig. 7B).
The fibrotic tissue around the phalanx is removed. This is accomplished by using the edge of a No.15 blade and literally peeling the tissue and periosteum away from the bone (Fig.8A-B).

The bone is then rasped smooth. This will eradicate the offending portion of the nail matrix and prevent recurrence of the incurvated portion of the nail plate.
The excessive nail lip is then remodeled so as to create a normal looking nail groove. The best method of doing this remodeling is to hold the nail lip against the nail plate by applying pressure with the finger tips and cutting the hypertrophic nail lip with a No. 10 blade (Fig. 10A-B).
While this maneuver might seem difficult at first, it does allow for the complete removal of the hypertrophic lip leaving behind a normal looking toe that will heal with little induration and excellent cosmetic results.

Two sutures of 5-0 Nylon are used to approximate the wound; one proximal to the eponychium and one distal at the tip of the toe (Fig. 11A-B). Healing is usually uneventful.

![Figure 11 A.](image1) ![Figure 11B.](image2)

**Precautions**
Some important points to keep in mind while performing the **Winograd Onychoplasty** are the following:

1. Make the first (longitudinal) incision **long** enough. This will make closure easier.
2. The second (semi-elliptical) incision should **not** be made too wide as this will make closure harder.
3. Take as much of the **indurated** nail lip as possible during the nail lip remodeling portion of the operation. This will give excellent cosmetic results.
4. A couple of drops of **Decadron** (dexamethasone sodium phosphate) should be infiltrated at the surgical site to minimize postoperative pain and inflammation.

+Watch surgical video clip