Management of Ingrowing Nails

Treatment Scenarios and Practical Tips

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Chapter 1
Basics

Abstract Performing successful nail surgery requires a comprehensive knowledge of nail anatomy and physiology. Understanding both the vascular and neural pathways supplying the nail complex, the functions and relationship of each component of the nail unit is also essential. The preoperative consultation is mandatory as it allows a detailed evaluation of the patient as well as a full information about the procedure and post operative evolution. The nail surgeon should use adequate instruments for nail surgery and be aware of the techniques and tips allowing an efficient anesthesia with minimal patient discomfort. Post operative procedure includes the proper use of painkillers and wound care. As for any kind of surgery, the operator needs to prevent and handle any complication that may occur during follow-up.

Keywords Nail • Anatomy • Nail instruments • Nail unit anesthesia • Dressings

Surgical Anatomy

Introduction

Before embarking to any nail surgery, a good knowledge of the anatomy of the nail unit is mandatory (Fig. 1.1). It will help to understand how to perform an adequate local anesthesia as well as reasonable procedures at that site and how to deal with post operative bleeding.

The nail apparatus is an integral part of the tip of the digit. All parts are intimately related to each other forming a functional, sensory and cosmetic unit. It is made up of the distal bony phalanx with the joint and synovial membrane, a fibrous network consisting of ligaments, tendons, and connective tissue strings, blood vessels and glomus bodies, nerves and receptors – making it an extremely efficient

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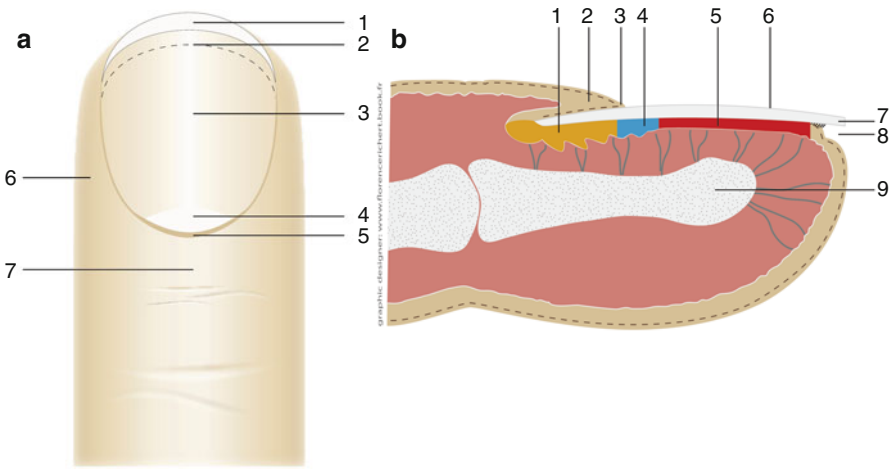

Fig. 1.1 (**a**) Anatomy of the nail apparatus. Upper view. *1* free edge, *2* hyponychium, *3* nail bed. *4* lunula, *5* cuticle, *6* lateral nail fold, *7* proximal nail fold. (**b**) Anatomy of the nail apparatus. Lateral view. *1* proximal nail matrix, *2* proximal nail fold, *3* cuticle, *4* distal nail matrix, *5* nail bed, *6* nail plate, *7* free edge, *8* distal groove, *9* distal phalanx

sensory organ – and the nail unit [1]. The later consists of three different epithelial structures: the nail matrix and the plate, the nail bed that firmly attaches the plate to the underlying connective tissue, the bone and the paronychium (grooves and folds) that act as a frame for the nail plate [2].

Nail Matrix

The nail matrix constitutes the sole germinative structure responsible for the production of the nail plate. It is located on the proximal dorsal aspect of the distal phalanx and just distal to the interphalangeal joint, mostly covered by the proximal nail fold (PNF). The matrix rests on the base of the distal bony phalanx and forms a crescent with posterior inferior concavity (Fig. 1.2); thus, its lateral corners are more proximal than the center. One should bear in mind that on the great toes, both lateral ends of the crescent (also called the lateral horns of the matrix) expand much proximal on the lateral aspect of the phalanx than that of the fingers (Fig. 1.3). The lateral horns may reach to or even beyond the midline of the lateral aspect of the great toe. This anatomical particularity explains why spicules are the most common complication of surgical treatment for ingrown toenail in unskilled hands [3]. The lunula, the most distal part of the nail matrix, is visible as a whitish half-moon shaped structure between the cuticle and the pink nail bed. The lunula is most often only visible on the thumb and middle finger. Pushing back the cuticle renders it visible on other

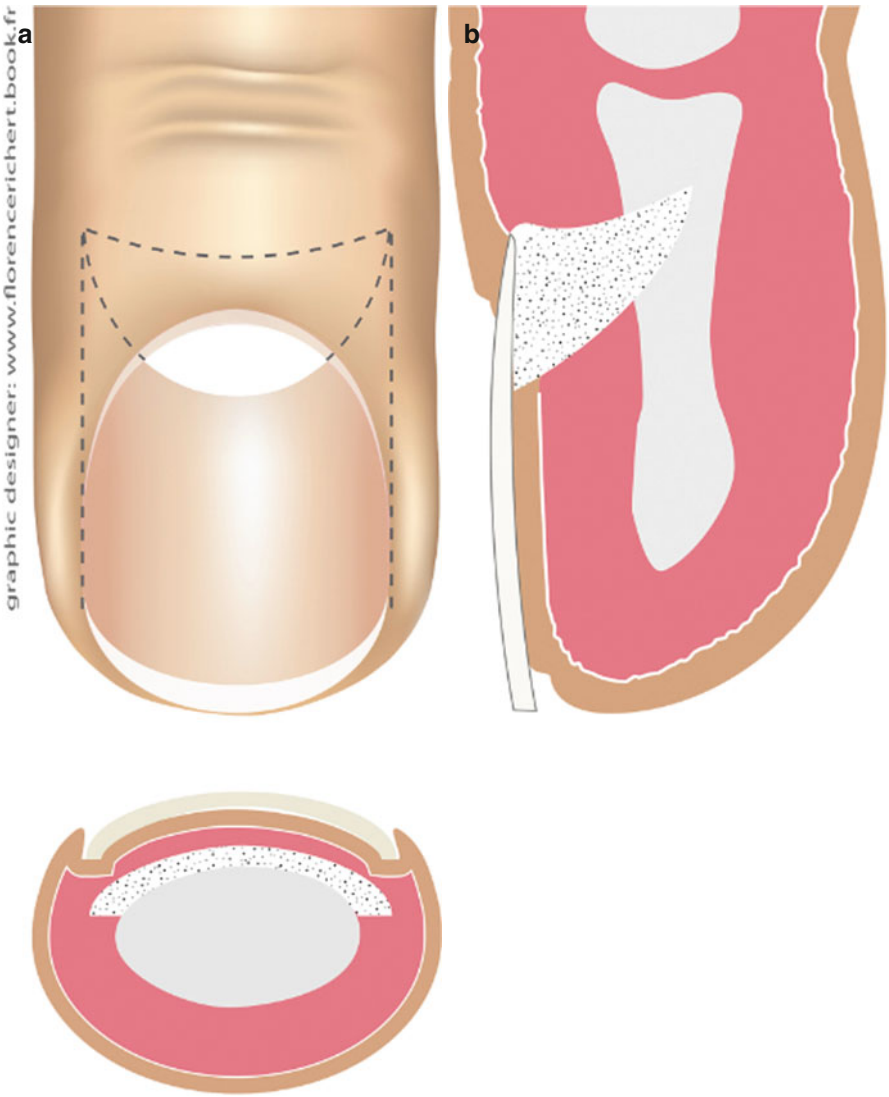

Fig. 1.2 (**a**) Anatomic position of the nail matrix. Upper and transverse view. (**b**) Anatomic position of the nail matrix on the great toenails. Lateral view

fingers and toes. The dermis of the matrix is a relatively loose connective tissue of about 1 mm thick that rests over the very distal fibers of the extensor tendon insertion. There is very little subdermal fat in the matrix [4]. The matrix creates all or most of the nail plate [5]. The proximal portion of the matrix produces the upper third of the nail plate and its distal part the lower two thirds [6] (Fig. 1.4). This has a main issue in nail surgery: removing a part of the distal

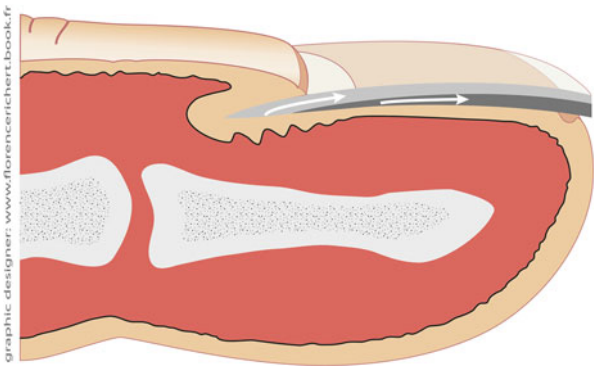

Fig. 1.3 Formation of the nail plate by the matrix: the superficial upper third comes from the proximal matrix, the lower 2/3 from the distal matrix

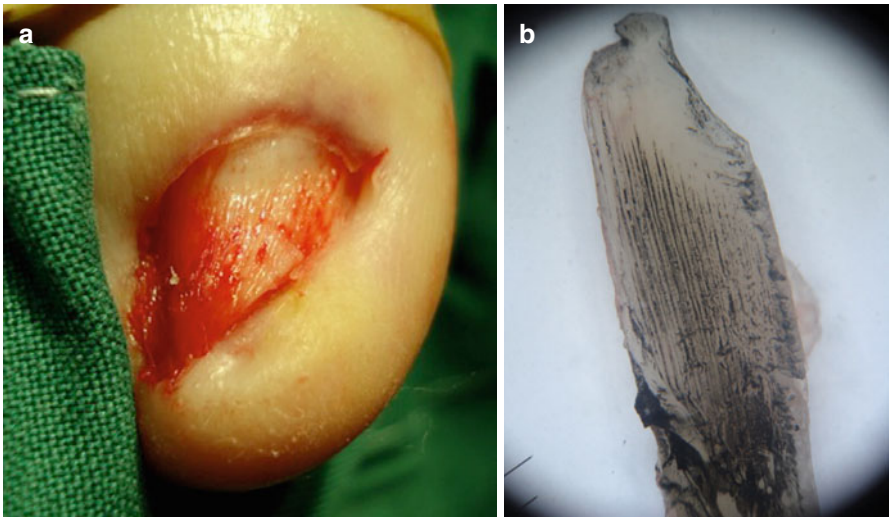

Fig. 1.4 (**a**) Longitudinal rete ridges running on the whole length of the nail bed. (**b**) Undersurface of the nail plate showing the complementary set of ridges (after friction with ink)

matrix (e.g., with a punch) will not lead to nail dystrophy as the defect will be covered by the upper part of the plate synthesized by the proximal matrix. The thickness of the nail plate is proportional to the length of the matrix (thumbnails and great toenails are thicker). The shape of the lunula determines the contour of the free edge [6].

Key Points
The lateral horns of the matrix may extend up and even beyond the midline of the lateral aspect of the great toenail.