

Management of Ingrowing Nails

Treatment Scenarios
and Practical Tips

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Contents

1 Basics	1
Surgical Anatomy	1
Introduction	1
Nail Matrix	2
Nail Bed	5
Nail Folds	5
Hyponychium	5
Nail Plate	6
Vascular Supply	6
Nerve Supply	7
Skeleton	7
Pre-operative Consultation	9
General Considerations	9
Information on the Surgical Procedure	10
Information on Labour Disruption	10
Premedication	11
Antibiotic Prophylaxis	12
Discontinuance of Drugs	12
Instrumentation	12
Disinfection of the Surgical Field	20
Anesthesia	20
Anesthetic Products	21
Material	22
Techniques of Injection	22
Tips for Reducing Pain	26
Complications and Management	26
Dressings	27
Non Adherent Dressing	28
Absorbent Dressing	29
Securing the Dressing	29

Post Operative Management	29
Pain Control	29
Dressing Removal and Replacement	30
Follow-up	31
References.	31
2 Definition – Pathogenesis Risk	
Factors – Classification – Scoring	35
Definition	35
Pathogenesis	35
An Epidermal Breakage in the Lateral Nail Sulcus	36
A Pinching of the Subungual Soft Tissues (Pincer Nail)	36
A Swelling of the Periungual Tissue.	37
Risk Factors	38
Nail Abnormalities	39
Forefoot Abnormalities.	39
Genetic Predisposition	39
Trauma	40
Systemic Diseases.	41
Improper Nail Cutting.	41
Classification and Clinical Features	41
Lateral Ingrowing Without Modification of the Curvature of the Plate	41
Lateral Ingrowing with Modification of the Curvature of the Plate	45
Distal Ingrowing	49
Proximal Ingrowing	50
Lateral and Distal Ingrowing	51
Staging (Severity Index)	54
References.	56
3 Conservative Treatment	59
Abstention.	60
Taping	61
Acrylic Nails	63
Dental Thread/Cotton	65
Compression	68
Orthonyxia: Nail Brace Technique	68
Nail Tube Splinting (Sleeve Technique)	72
Miscellaneous	74
References.	74
4 Surgical Treatment	77
Avulsion	77
Surgical Resection of the Matrix Horns	80
Classical Wedge Resection	80
Curettage of the Matrix.	84

Physical Destruction of the Matrix Horns	86
Electrosurgery	86
Radiocautery	87
Laser	88
Chemical Destruction of the Matrix Horns.	89
Phenol 88 %	89
Sodium Hydroxyde (NaOH) 10 %	94
TCA 100 %	95
Resection of the Soft Tissues	97
Howard Dubois' Procedure.	97
Noel's Procedure.	100
Debulking of Soft Tissue with Secondary Intention Healing (Vandenbos' and Super "U")	102
Tangential Excision ("Shaving").	106
Tweedie and Ranger Flap	107
Derofing	109
Surgical Procedures on the Bone and/or Bed for Pincer Nails	111
Flattening the Bone and Spreading the Nail Bed (Hanke's Procedure, Suzuki's Variant, Fanti's Variant, Kosaka's Variant)	111
Elevation of the Lateral Part of the Nail Bed in Pincer Nail (Zook's Procedure)	118
References.	121
5 Potential Complications and Their Management	125
Complications Shared with Other Surgeries.	126
Post operative Pain	126
Dysesthesia	126
Bleeding	127
Infection	128
Necrosis.	129
Recurrence	131
Implantation Cyst	132
Reflex Sympathic Dystrophy (RSD).	133
Hypertrophic Scar and Cheloid.	134
References.	135
6 Case Reports	137
Clinical Case 1 Nilton Gioia Di Chiacchio.	137
Type of Ingrowing Toenail	138
Scoring	138
Aim of the Treatment	138
Management	138
Result	141

Clinical Case 2 Nilton Gioia Di Chiacchio.	142
Type of Ingrowing Toenail	142
Scoring	142
Aim of the Treatment	142
Management	143
Result	145
Clinical Case 3 Nilton Gioia Di Chiacchio.	146
Type of Ingrowing Toenail	146
Scoring	146
Aim of the Treatment	146
Management	147
Result	149
Clinical Case 4 Nilton Gioia Di Chiacchio.	150
Type of Ingrowing Toenail	150
Heifetz Scoring	150
Aim of the Treatment	150
Management	151
Result	151
Clinical Case 5 Nilton Gioia Di Chiacchio.	153
Type of Ingrowing Toenail	153
Heifetz Scoring	153
Aim of the Treatment	153
Management	153
Result	154
Clinical Case 6 Nilton Di Chiacchio.	155
Scoring–Type of Ingrowing Toenail	155
Heifetz Scoring	155
Aim of the Treatment	155
Management	156
Result	157
Clinical Case 7 Nilton Di Chiacchio.	158
Scoring–Type of Ingrowing Toenail	158
Heifetz Scoring	158
Aim of the Treatment	158
Management	158
Result	160
Clinical Case 8 Nilton Di Chiacchio.	161
Scoring–Type of Ingrowing Toenail	161
Heifetz Scoring	161
Aim of the Treatment	161
Management	161
Result	163
Clinical Case 9 Nilton Di Chiacchio.	164
Type of Ingrowing Toenail	164
Heifetz Scoring	164

Aim of the Treatment	164
Management	165
Result	166
Clinical Case 10 Nilton Di Chiacchio	167
Scoring–Type of Ingrowing Toenail	167
Heifetz Scoring	167
Aim of the Treatment	167
Management	168
Result	168
Clinical Case 11 Marie Caucanas	169
Type of Ingrowing Toenail	171
Scoring	171
Aim of the Treatment	171
Management	171
Result	171
Clinical Case 12 Marie Caucanas	172
Type of Ingrowing Toenail	172
Scoring	172
Aim of the Treatment	173
Management	173
Result	173
Clinical Case 13 Marie Caucanas	174
Type of Ingrowing Toenail	174
Scoring	174
Aim of the Treatment	174
Management	175
Result	175
Clinical Case 14 Marie Caucanas	176
Type of Ingrowing Toenail	176
Scoring	176
Aim of the Treatment	176
Management	177
Result	178
Clinical Case 15 Marie Caucanas	179
Type of Ingrowing Toenail	179
Scoring	179
Aim of the Treatment	179
Management	180
Result	181
Clinical Case 16 Bertrand Richert	182
Type of Ingrowing Toenail	183
Scoring	183
Aim of the Treatment	183
Management	183
Result	184

Clinical Case 17 Bertrand Richert	185
Type of Ingrowing Toenail	186
Scoring	186
Aim of the Treatment	186
Management	186
Result	187
Clinical Case 18 Bertrand Richert	189
Type of Ingrowing Toenail	190
Scoring	190
Aim of the Treatment	190
Management	190
Result	190
Clinical Case 19 Bertrand Richert	192
Type of Ingrowing Toenail	193
Scoring	193
Aim of the Treatment	193
Management	193
Result	193
Clinical Case 20 Bertrand Richert	195
Type of Ingrowing Toenail	196
Scoring	196
Aim of the Treatment	196
Management	196
Result	196
Index	199

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

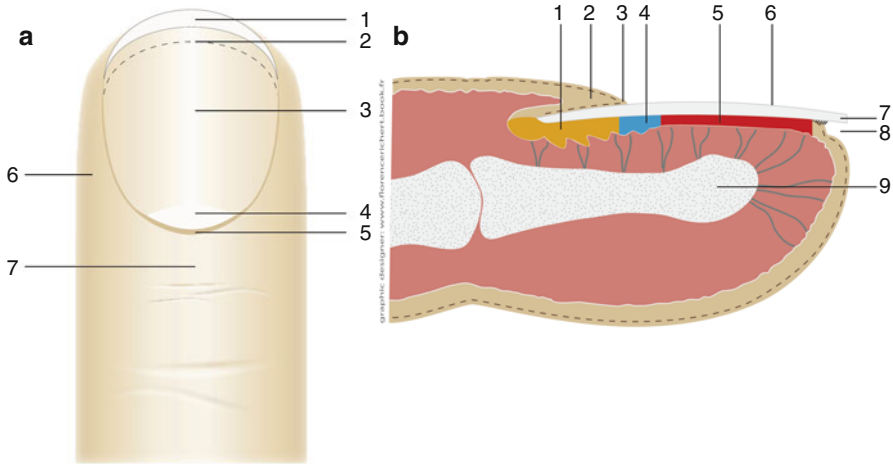


Fig. 1.1 (a) Anatomy of the nail apparatus. Upper view. 1 free edge, 2 hyponychium, 3 nail bed, 4 lunula, 5 cuticle, 6 lateral nail fold, 7 proximal nail fold. (b) Anatomy of the nail apparatus. Lateral view. 1 proximal nail matrix, 2 proximal nail fold, 3 cuticle, 4 distal nail matrix, 5 nail bed, 6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

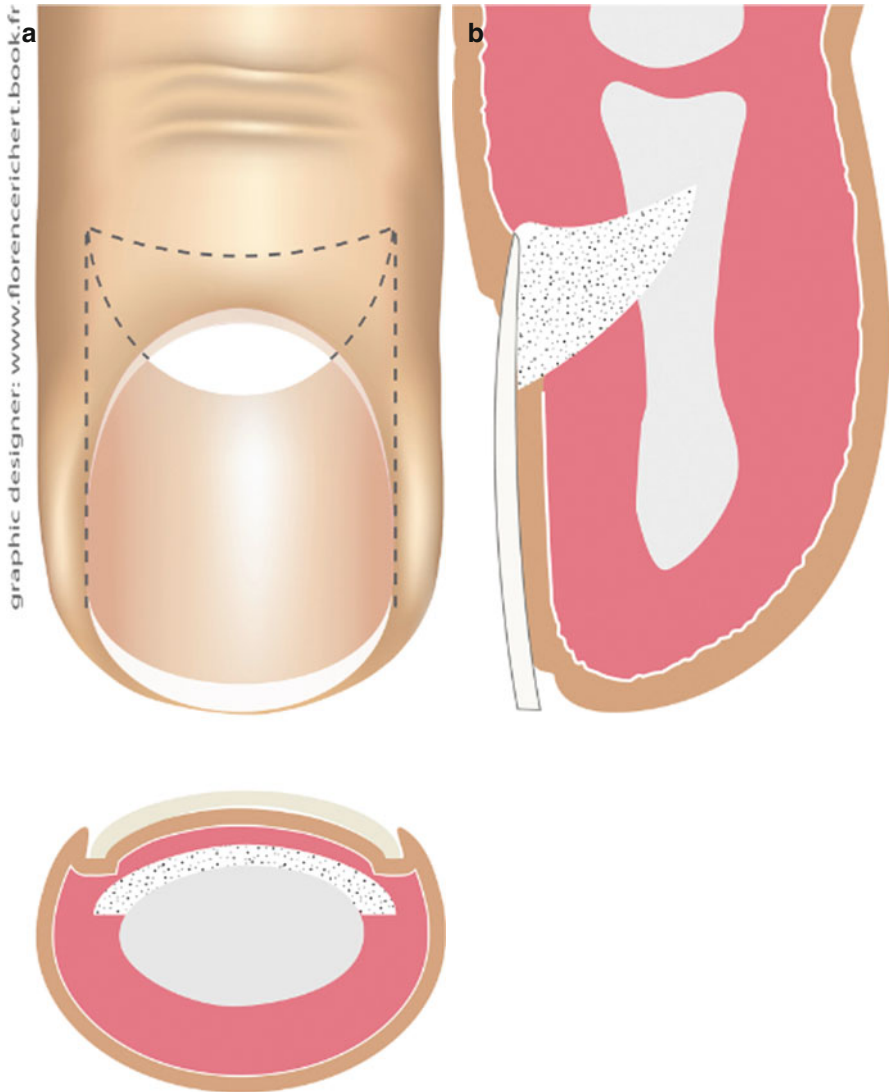


Fig. 1.2 (a) Anatomic position of the nail matrix. Upper and transverse view. (b) Anatomic position of the nail matrix on the great toenails. Lateral view

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

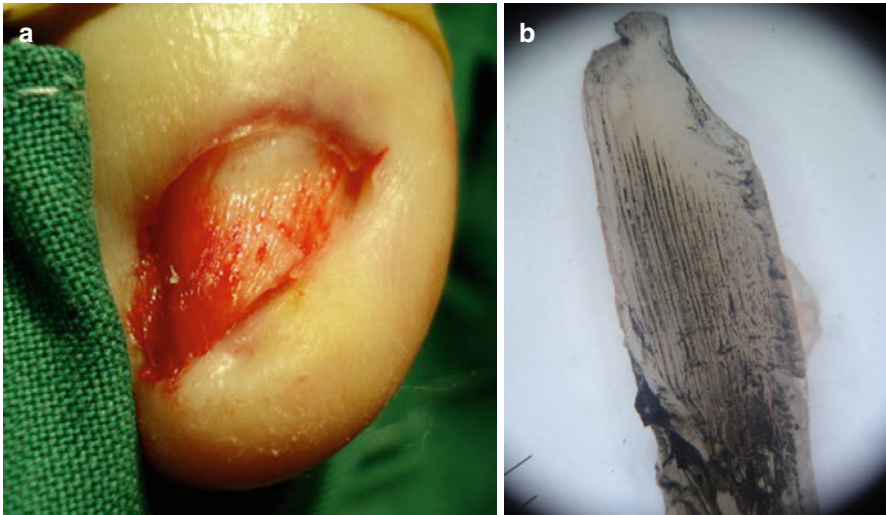
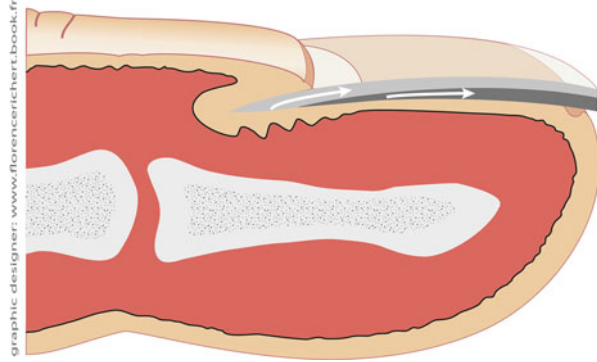


Fig. 1.4 (a) Longitudinal rete ridges running on the whole length of the nail bed. (b) Undersurface of the nail plate showing the complementary set of ridges (after friction with ink)

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.