Complications in nail surgery and prevention strategies: a comprehensive review

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Abstract

Nail surgery, commonly performed to manage a wide range of nail disorders, is associated with potential complications that can affect patients' recovery and outcomes. This review provides a detailed overview of these possible complications and strategies for their prevention. Surgical complications in nail procedures can be classified into specific and non-specific. Specific complications are associated with damage to particular structures of the nail unit, such as the matrix, nail bed, or hyponychium. Non-specific complications, such as hematoma, infection, and necrosis, may be a consequence of any surgical procedure and are not directly related to the anatomical structures involved in the operation. Recognizing factors that can contribute to these complications, such as the choice of surgical techniques, patient comorbidity management, and the implementation of postoperative care practices, is essential to reduce their incidence. This work reports the current evidence and best practices in order to reduce surgical risks and improve patient outcomes. Examining each complication and its prevention strategies in detail, this review is a practical resource for clinicians who manage nail surgery cases.

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Key words: nail surgery; complications; surgical prevention; postoperative care; nail biopsy.

Conflict of interest: the authors declare no potential conflict of interest.

Ethics approval and consent to participate: not applicable.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Received: 15 December 2024.
Accepted: 29 January 2025

Dermatology Reports 2025; 17:10216
doi:10.4081/dr.2025.10216

Introduction

Nail surgery is a specialized field aimed at diagnosing and treating a variety of nail disorders, including tumors, infections, and deformities. While it is generally considered a safe and effective procedure, complications can arise, impacting both the functional and aesthetic outcomes. These complications can be broadly categorized into specific, which affect target structures, including the nail matrix, bed, or hyponychium, and non-specific, which include general surgical risks such as infection, hematoma, or necrosis. Factors such as patient comorbidities, surgical technique, and postoperative care play a significant role in determining the incidence and severity of these complications. This review provides a comprehensive exploration of both specific and non-specific complications, as well as evidence-based approaches to their prevention and management, offering a practical resource for dermatologists involved in nail surgery.

Specific complications

Specific complications include nail deformities resulting from damage to different components of the nail apparatus during surgical procedures. Damage to the nail matrix may cause dorsal ungual pterygium, nail splitting, nail ridging, and acquired malalignment of the nail plate. Incomplete removal of the lateral matrix horns may lead to spicula formation. Damage to the nail bed can cause epidermal inclusion cysts, hook nail deformity, ventral pterygium, onycholysis, and disappearing nail bed (Table 1).

Matrix complications

Dorsal ungual pterygium

A dorsal pterygium may develop when the exposed dermis or subcutaneous tissue of the proximal nail fold remains in contact with the exposed dermis or subcutaneous tissue of the matrix or nail bed. The result is a bridging scar connecting the ventral part of the proximal nail fold to the nail plate, obliterating the matrix sulcus, where the nail plate grows (Figure 1a). Pterygium is a permanent deformity that can be surgically corrected, but the procedure is difficult.[1] It may cause restriction in nail growth and pain.

The risk of dorsal pterygium is higher after matrix surgery (removal of onychomatricoma, excision of longitudinal melanonychia). Dorsal pterygium can be avoided through the insertion of a barrier between the exposed tissues, preventing direct contact and fibrosis.[1]

- Fragment of autologous nail plate;
- Petrolatum or vaseline-impregnated gauze (tulle gras);
- Suture foil pack;
- Latex-free sterile nasopharyngeal tube in green color (Robertazzi Nasopharyngeal Airway, 20 Fr; SunMed Medical Systems, Marlton, NJ);1

Table 1. Nail surgery complications overview.

Complication	Description	Cause	Prevention
Dorsal ungual pterygium	A scar connecting the proximal nail fold to the nail bed, obliterating the matrix sulcus	Direct contact between exposed matrix dermis and the under surface of the proximal fold, ending in a synechia	Insert a barrier (e.g., nail plate fragment, silicone sheet) between tissues and remove it 1-2 weeks post-surgery
Nail splitting	Longitudinal fissure of the nail plate, temporary or permanent	Biopsies of the proximal and central matrix	Limit biopsies to the distal matrix; perform ≤3 mm biopsies; reposition the nail plate after the biopsy
Acquired malalignment of the nail plate	Lateral deviation of the nail plate axis relative to the finger axis	Wide lateral biopsies (>3 mm) or loss of lateral nail fold	Keep lateral biopsies ≤3 mm wide; avoid excessive excision of lateral nail folds
Nail spicula	Sharp nail plate fragments piercing the skin causing inflammation or discharge	Incomplete removal of the lateral horn of the nail matrix	Identify and completely remove the lateral horn; meticulous dissection down to the bone is essential
Epidermal inclusion cysts	Asymptomatic soft masses near scars	Implantation of epidermal cells into dermis due to suturing or needle trauma	Handle tissues gently during suturing; avoid stitching from outside towards the nail bed
Hook nail deformity	Curved nail plate growing over the fingertip, often painful and disabling	Shortening of the phalangeal bone after fingertip amputation	Remove excess nail bed tissue; resurface fingertip with tension-free flaps; maintain nail apparatus proximity to bone for support
Ventral pterygium	Adhesion between the hyponychium and ventral nail plate, obliterating the distal nail sulcus	Adhesion formation after distal nail bed surgery	Preserve a 3-4 mm margin from the distal sulcus during excisions; avoid adhesions by careful technique
Onycholysis	Separation of the nail plate from the nail bed	Destruction of the longitudinal ridges on the nail bed allowing adherence of the plate	Avoid lateral elevator movements; minimize trauma during nail plate detachment; use appropriate dressing or substitutes for the nail plate
Disappearing nail bed	Shortened or narrowed nail bed with potential cosmetic and functional concerns	Prolonged onycholysis leading to nail bed epithelialization	Reposition nail plate where possible; use gel foam or nail plate substitutes to cover exposed nail bed
Cuticle retraction	Retraction or asymmetry of the cuticle, affecting nail contour appearance and function	Biopsies or excisions performed too close to the cuticle	Ensure biopsies are as far as possible of to the cuticle
Fingertip necrosis	Tissue death resulting from ischemia due to prolonged tourniquet use	Prolonged or excessive tourniquet pressure; theoretical risk from epinephrine use	Limit tourniquet time to 20-30 minutes; deflate intermittently for longer procedures; avoid excessive tension on flaps
Infections	Post-surgical infections of nail folds or surrounding tissues	High microbial load in the nail area; increased risk with invasive procedures	Ensure sterile surgical conditions; clean and disinfect the surgical site; consider prophylactic antibiotics in high-risk patients (e.g., diabetics, immunocompromised)
Hematoma	Painful bleeding between the nail plate and nail bed, may lead to secondary infection	Inadequate drainage or dead space between nail plate and nail bed	Ensure proper drainage (e.g., 3 mm punch holes in the nail plate); use compressive dressing; avoid excessive or tight sutures
Complex regional pain syndrome I	Pain associated with sensory, vasomotor, sudomotor, motor and trophic nail unit alterations	Multifactorial, secondary to nail unit trauma	-

- Silicone sheet;
- Polypropylene-based nail splint (INRO Surgical Nail Splint, INRO Medical Designs, Desoto, TX),2 polypropylene sheets obtained from the reservoir of the infusion set (Medial International S.p.a., Italy).[3]

The barrier is inserted under the proximal nail fold, over the matrix and/or bed defect, and secured with an absorbable suture, fixing it to the nail fold skin.[1] Then, it must be removed 1-2 weeks after the surgical procedure. By this time, the matrix will have healed and begun synthesizing nail keratin.[4]

In most instances, the defect on the matrix/bed is covered by the original nail plate, which is put back in place and secured to the lateral nail fold. This prevention is mainly used for onychomatrycoma and is not necessary for a simple avulsion for total dystrophic onychomycosis or excision of submatrix tumors.

Nail splitting

Nail splitting is characterized by a longitudinal fissure involving the entire thickness of the nail plate[5] in its entire length or limited to its distal part. It may cause functional impairment in everyday activities (for example, catching clothes) and discomfort. It often results from biopsies performed on the proximal and central nail matrix.

Minor nail matrix scarring (less than 3 mm) results in a temporary longitudinal fissure (Figure 1 b-d). This fissure is usually observed when the nail regrows and lasts for 6-12 months on fingernails and for 12-18 months on toenails. It disappears, being replaced by permanent longitudinal chromonychia (erythronychia or leuconychia).[6]

In general, preserving the proximal and central matrix, the primary site of nail plate genesis, can mitigate nail splitting.[7] When possible, nail matrix biopsy should be confined to the distal matrix.[8]

If the lunula is not visible, distal nail matrix biopsies should be preceded by the reflection of the proximal nail fold and the proximal portion of the nail plate with the so-called "sardine bow avulsion" technique (also known as partial proximal nail plate avulsion).[9] Then, matrix biopsy may be performed using one of these different techniques: i) a small punch biopsy no larger than 3 mm;[10] ii) a tangential excision up to 1 mm thick.[13]

In addition to the "sardine bow avulsion" technique, a modified version of the "window technique", implemented by one of the authors (GC) (Figure 2 a,b), uses a CO_2 laser to create a rectangular-shaped opening in the proximal nail plate, allowing access to the nail matrix for incision/excisional biopsy.[14]

In all these cases, after the biopsy, the proximal portion of the nail plate should be replaced, and the proximal nail fold must be sutured to the lateral nail folds with two stitches.

Acquired malalignment of the nail plate

Nail malalignment is the lateral deviation of the long axis of the nail from the axis of the terminal phalanx. There are three main types of nail malalignment: congenital nail malalignment of the big toenail, traumatic nail malalignment, and iatrogenic malalignment of the nail plate.[15]

The latter is a complication of wide lateral longitudinal biopsies of the nail unit[16] (biopsy larger than 3 mm in width from the lateral margin) with or without loss of the lateral nail fold after tumor removal, which may be Bowen's disease, squamous cell carcinoma, longitudinal melanonychia, and others. Nail deviation to the operated side was also observed after laser surgery of ungual Bowen's disease.[15]

Malalignment of the nail plate clinically presents with lateral deviation of the nail plate towards the side of the excision (Figure 3a). It may cause both functional impairment and cosmetic concerns. It has been observed that the half-moon shape of the lunula of some of the operated nails was deformed and trapezoidal, with its greatest width presenting in the normal portion of the nail.[15]

Unlike congenital malalignment and traumatic malalignment, iatrogenic malalignment does not respond to treatment.[15] This complication occurs due to an imbalance in nail matrix tissue distribution following surgery. Specifically, the deviation toward the operated side is caused by a relative deficiency of matrix tissue in that region, while the opposite side produces more nail tissue. This uneven production results in lateral deviation of the nail plate toward the surgically treated side.[16] To minimize the risk of this

Figure 1. a) Dorsal pterygium and split nail resulting from an improper longitudinal biopsy for melanonychia; **b**) temporary nail splitting observed immediately after the procedure; **c**) six months later; and **d**) twelve months following the removal of an onychopapilloma.

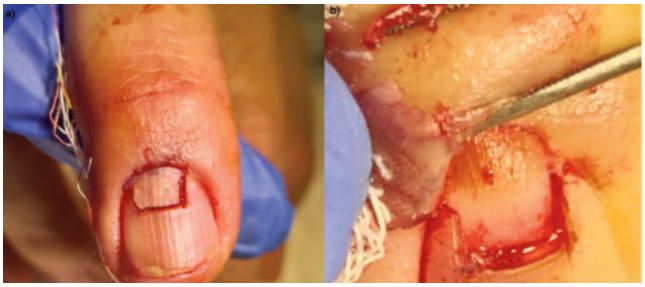

Figure 2. Modified window technique: **a**) the targeted rectangular region of the nail plate is carefully dissected, leaving a small attachment at the proximal lateral border near the distal matrix to ensure the proximal nail fold remains intact. After exposing the nail matrix by lifting and shifting the nail plate from the attached side, the pigmentation of the matrix is assessed, and a punch biopsy is performed. **b**) The lifted nail plate fragment is then repositioned and secured.

complication, it is recommended that lateral longitudinal biopsies performed for diagnostic purposes be limited to a maximum width of 3 mm to reduce the likelihood of acquired malalignment. For cosmetic reasons, in cases where more than half of the nail unit is removed, complete removal of the nail unit with subsequent grafting may be suggested to patients.

Nail spicula

Spicula are small, sharp fragments of the nail plate that develop when the lateral horn of the nail matrix is not completely removed (Figure 3b).[4] This can occur following procedures such as lateral matricectomy, lateral longitudinal excision, or total nail unit removal.[6] It starts with inflammation of the most proximal part of the lateral nail fold, usually after 2 months, with sometimes some purulent discharge. While the spicule has pierced the skin, inflammation lessens, and healing occurs, leaving a horn popping out from the lateral sulcus or from the lateral aspect of the digit.[4]

To avoid this complication, it is mandatory to ensure the complete removal of the lateral horn of the matrix lying close to the junction of the volar and dorsal skin at the finger and ventral junction, especially on the thumb and great toenail, where they may reach the medial part of the lateral aspect of the digit.[6]

Nail bed complications

Epidermal inclusion cysts

Epidermal inclusion cysts develop from the traumatic implantation of epidermal cells into the dermis or subcutaneous tissues (Figure 3c).[4] They are an infrequent complication of nail surgery, with an incidence reported to be 5.5%.[17]

Clinically, they present as asymptomatic soft masses in the immediate vicinity of a scar, adherent to the skin and underlying tissues (Figure 3d). Epidermal inclusion cysts can enlarge progressively over time.[4] They are caused by skin entrapment, are associated with suturing and needle trauma, and may arise from any type of surgery involving the nail apparatus.[18]

Prevention necessitates gentle mobilization of tissue when suturing or using penetrating tools.[6] Moreover, it is suggested to suture from the folds towards the nail bed, never from outside towards the nail bed, to avoid implantation of epidermis in the nail bed's dermis.[17]

Figure 3. a) Acquired malalignment of the digit following partial nail resection; **b**) nail spicules forming after chemical matricectomy for an ingrown nail; **c**) subungual soft lump corresponding to a large inclusion cyst caused by improper suturing after minor surgery for previous nail trauma; **d**) localized swelling on the lateral aspects of the digit after a lateral resection of a Bowen disease with lateral advancement flap, consistent with an inclusion cyst.

Hook nail deformity

The hook nail deformity presents when the terminal phalangeal bone[4] has been shortened, and the nail bed has kept its original length and extended over the tip of the digit, thus causing a much more pronounced longitudinal curvature of the nail plate (Figure 4a). It may be painful and may cause difficulty with fine discrimination tasks. Hook nail deformity is mostly observed as a complication after fingertip amputations, which causes phalanx bone shortening,[4,19] with consequent loss of bony support under the nail bed that leads to volar curving.[19]

Hook nail deformity is rare if only the distal third of the nail bed is involved, but if the distal two-thirds are involved, 50% of patients develop hook-nail deformity.[20]

Despite the frequency of this complication, literature is scarce regarding the prevention of hook nail deformity[19] as it usually follows a trauma.

Several surgical techniques to prevent it have been described:

Nail bed shortening: after removing the nail plate, the portion of the nail bed extending beyond the tip of the terminal phalanx is carefully excised, including an additional 2 mm to account for terminal phalanx shortening. This reduces the length of the nail bed and mitigates the nail plate over-curvature. The fingertip is then resurfaced using a V-Y advancement flap, with precautions to avoid any tension in the flap.[21]

Proximal relocation of the nail apparatus: this technique involves repositioning the nail apparatus more proximally to reestablish bony support. Some methods emphasize using a needle to maintain the flap while carefully avoiding over-tensioning at

Figure 4. a) Hook nail; **b**) pterygium inversum unguis; **c**) disappearing nail bed following Emmert-plasty (wedge excision of the nail fold, nail edge, and corresponding matrix) for an ingrown toenail; **d**) cuticle retraction after complete excision of an onychomatricoma.

the junction between the flap and the residual nail bed.[22,23]

Bone grafting: this approach involves harvesting a unicortical iliac bone graft and inserting it into the deficient distal phalanx to restore bony support. The graft is stabilized with K-wires for structural integrity during healing and is often paired with soft tissue coverage techniques, such as pedicled flaps, to optimize outcomes.[36 24]

Ventral pterygium (or pterygium inversum unguis)

Ventral pterygium, also called pterygium inversum unguis, can develop following distal nail bed surgery at the hyponychium level. This is a very rare complication, mainly observed after accidental burns. This condition arises from adhesion between the hyponychium and the ventral surface of the nail plate, leading to the obliteration of the distal nail sulcus (Figure 4b). Clinically, it is both painful and disabling, as patients are unable to trim their nails effectively.[6]

To prevent this complication, a margin of 3-4 mm from the distal sulcus during the Howard-Dubois procedure ("fish-mouth" excision for distal ingrowing or subungual tumors) is recommended. This technique helps preserve the anatomical integrity of the distal sulcus and reduces the risk of adhesion formation.

Treatment of this condition includes the removal of the cicatricial tissue followed by a thin skin graft.

Onycholysis

Onycholysis refers to the separation of the nail plate from the nail bed. It results from the destruction of the longitudinal grooves running on the bed and interlocking with negative structures on the undersurface of the plate. It arises from improper techniques during surgical procedures, such as nail plate avulsion. To avoid this complication, it is critical to refrain from performing lateral movements with the elevator when detaching the nail plate, as this can damage the delicate longitudinal ridges of the undersurface of the plate, leading to permanent onycholysis. Additionally, using scissors with repeated openings and closures should be avoided to prevent unnecessary trauma to the nail bed and surrounding structures.[4]

Disappearing nail bed

This condition is clinically characterized by a shortened or narrowed nail bed, resulting from epithelialization of the nail bed when it remains uncovered by the nail plate for an extended period of time (Figure 4c).[25] This phenomenon may occur in cases of prolonged onycholysis,[25,26] defined as the separation of the nail plate from the nail bed, or following complete avulsion of the nail plate. These changes can cause cosmetic concerns for patients and are associated with an increased risk of developing onychomycosis and distal paronychia.[27] The nail plate is a laminated keratinized structure that overlies the nail bed and nail matrix. A normal nail bed does not have a granular layer.[27] When not covered by the nail plate, the nail bed undergoes keratinization and produces dermatoglyphics, like the normal tip of a digit.[26] Additionally, the shape of the distal digit may become distorted.[25]

The exact duration required for the nail bed to epithelialize when left uncovered remains unclear. This has important implications because once distal nail bed epithelization occurs, it is more difficult to reattach the nail plate.[25]

In case of nail plate avulsion, it is essential to reposition the nail plate when possible. If not possible, it is recommended to use appropriate dressings, such as gel foam or nail plate substitutes. Moreover, it is important to avoid traumatizing the nail bed while detaching the nail plate from the nail bed with incorrect movements, which can cause onycholysis (see above).

Other complications

Cuticle retraction

Retraction and asymmetry of the cuticle are potential complications when a procedure is performed close to this delicate structure (Figure 4d).[6] These outcomes can significantly affect the nail's appearance and function, underscoring the need for precise surgical planning. Retraction and asymmetry of the cuticle mainly occur after the resection of tumors on the proximal fold or after the resection of a lateral tumor of the nail unit.

Biopsies or excisions in this region should be carefully placed as far as possible from the cuticle to preserve its integrity and avoid unnecessary trauma.[6]

Non-specific complications

Fingertip necrosis

Digital necrosis has been reported in cases of prolonged use of tourniquets,[28] where ischemia can result in severe complications, including finger amputation (Figure 5a). Even when the finger survives, patients may experience lasting morbidity, such as joint stiffness, dystrophy, allodynia, and cold intolerance.[6] A longstanding belief cautions against the use of lidocaine with adrenaline (epinephrine) for local anesthesia in fingers and toes, citing the risk of necrosis due to vasospasm in end-arteries. However, recent evidence disproves this concern,[29,30] estimating the risk of ischemic or necrotic events to be less than 1 in 100,000 patients undergoing nail surgery.[30] Additionally, there are no documented cases of epinephrine-induced harm in individuals with compromised peripheral circulation, such as those with Raynaud's phenomenon or vascular diseases, despite a theoretical risk of vasoconstriction-related complications.[31] To minimize the risk of ischemia, the tourniquet in nail surgery should not be left in place for longer than 20-30 minutes. If the procedure is expected to take more time, it is advised to deflate the tourniquet intermittently to allow for tissue reperfusion.[4]

Infections

The nail area, particularly the nail folds, harbors a high concentration of resident microbes, making it one of the most contaminated regions of the body (Figure 5 b,c).[32] Infection rates are higher following procedures on the foot and ankle as compared with procedures involving other areas of the body.[4] However, the incidence of infection in foot surgery remains low, ranging from 0 to 9.4%.[33] It is well established that the risk of infection increases with the invasiveness of the procedure.[34] While systemic antibiotic therapy is not routinely recommended, and local antibiotics do not effectively reduce infection risk,[35,36] special consideration should be given to immunocompromised, diabetic, and valvulopathic patients, where the use of systemic antibiotics may be indicated.

Various factors have been identified to help reduce the risk of infections:

Prophylactic antibiotics: these are indicated only for patients with high-risk cardiac conditions or those with prosthetic joints at high risk for joint infection. Prophylactic antibiotics are also recommended if the surgical site is already infected and confirmed by swab results, or for procedures on the lower extremities. Some practitioners suggest using prophylactic antibiotics for nail procedures with a higher risk of postoperative infection, such as in poorly managed diabetic patients and during bone surgery.[4]

Preoperative cleaning: proper cleaning of the surgical site is essential. Patients who work in environments where dirt accumu-

lates under their nails should soak their hands or feet in soapy water and clean them with a scrub brush for several days before surgery. Women should remove nail polish prior to the procedure.[4]

Reducing bacterial load: while it is impossible to completely disinfect the nail unit, bacterial load can be reduced. Recommended surgical field preparation includes an alcohol scrub followed by alcohol paint with a bristle or a chlorhexidine scrub followed by isopropyl alcohol paint.[4]

Postoperative care: dressing changes and the application of local antiseptics after surgery are essential. Patients must be educated on proper wound care. Those unable to manage their dressings independently should be referred to nursing care services.[30]

Hematoma

The nail unit is very well vascularized, and postoperative bleeding is common. Dealing with bleeding is a must in nail surgery (Figure 5d). Bleeding between the bed and the plate is very painful and may be secondarily infected.

To prevent this, an appropriate drainage should be planned to avoid any blood collection. Trephining the plate with a 3 mm biopsy punch may be an option.[4,6] Smaller holes may get clotted. A slight compressive dressing to avoid dead space formation between the plate and the bed is advisable. Skin sutures should not be too numerous and over-tightened.[6]

Complex regional pain syndrome I (or reflex sympathetic dystrophy)

Complex regional pain syndrome type I (CRPS I), formerly known as reflex sympathetic dystrophy (RSD), is a neurovascular disorder following trauma to an extremity.[37,38]

It is characterized by pain that is out of proportion to the initial injury and symptoms from at least three of the following categories: sensory disturbances like hyperalgesia and allodynia, vasomotor changes such as temperature and skin color asymmetry, sudomotor issues including edema and altered sweating, and motor/trophic changes like reduced range of motion, weakness, or soft tissue changes.[38] Initially, the symptoms of CRPS I are localized to the site of the lesion. During the course of the disease, pain and other symptoms may spread.[37,38]

CRPS I is more frequent in the upper extremity in women between 50 and 60 years of age,[37,38] with a female-to-male ratio between 2.3:1 and 4:1.[37]

The pathophysiology of this condition is thought to be multifactorial. The contributing mechanisms differ among individuals and can change over time in the same patient. Key factors include post-traumatic inflammation and autonomic nervous system dysfunction, characterized by heightened sensitivity of blood vessels to catecholamines and the development of adrenergic sensitivity in nociceptive neurons, as well as central sensitization, which results from increased input from peripheral nociceptors that disrupt central processing mechanisms.[37] Genetic influences in CRPS I are hypothesized but have not yet been conclusively demonstrated. Additionally, psychosocial factors, previously considered potential contributors, are no longer regarded as significant risk factors.[37,38]

There are no definitive diagnostic tests. Instead, the condition is diagnosed based on clinical evaluation using the Budapest criteria (Table 2).[38] It usually develops after minor trauma or injury to a small nerve. Usual causes include fractures, contusions, and

Figure 5. Non-specific complications: **a**) fingertip necrosis post-chemical matricectomy in a diabetic patient; **b**) superinfection observed 5 days post-chemical matricectomy; **c**) superinfection observed 7 days after complete removal of the nail apparatus for *in situ* melanoma in a diabetic patient; **d**) diffuse subungual hematoma in a patient under coumarins, after avulsion of a lateral strip of nail for onychomycosis.

Table 2. Budapest diagnostic criteria for CRPS I.

1. Continuing pain, which is disproportionate to any inciting event
2. Must report at least one symptom in 3 of the 4 following categories: - Sensory: reports of hyperalgesia and/or allodynia - Vasomotor: reports of temperature asymmetry, and/ or skin color changes, and/or skin color asymmetry - Sudomotor/edema: reports of edema, and/or sweating changes, and/or sweating asymmetry - Motor/trophic: reports of decreased range of motion, and/or motor dysfunction (weakness, tremor, dystonia), and/or trophic changes (hair, nail, skin)
3. Must display at least one sign at time of diagnosis in 2 or more of the following categories: - Sensory: evidence of hyperalgesia (to pinprick) and/ or allodynia (to light touch, and/or deep somatic pressure, and/or joint movement) - Vasomotor: evidence of temperature asymmetry, and/or skin color changes, and/or asymmetry - Sudomotor/edema: evidence of edema, and/or sweating changes, and/or sweating asymmetry - Motor/trophic: evidence of decreased range of motion and/or trophic changes (hair, nail, skin)
4. There is no other diagnosis that better explains the signs and symptoms

CRPS I, complex regional pain syndrome type I.

surgeries.[37,38] While nail surgery is a very common procedure in dermatology, only a few case reports of CRPS I resulting from nail surgery procedures have been described.[38-40]

The inciting surgical procedures included the excision of a glomus tumor in the nail bed[4] and in the nail matrix,[38] biopsy for melanonychia, excision of a myxoid cyst, and excision of a periungual tumor,[38] and biopsy for onychomychosis.[40] In CRPS I, nail abnormalities commonly reported include increased growth, abnormal curvature of the nail plate, leukonychia, Beau's lines, trachyonychia, brittle nails, swelling around the nail fold, and clubbing.[41,42] Effective management typically involves a multidisciplinary team focusing on pain management and physical rehabilitation.[37] No single treatment is universally effective for all patients. Research supports the early use of systemic steroids and bisphosphonates to reduce osteoclast activity in the early stages.[37] Pain management is challenging, and while the effectiveness of nonsteroidal anti-inflammatory drugs or opioids remains unproven, continuous intravenous ketamine infusion has shown promise in reducing pain. However, it can lead to severe side effects with prolonged use. Physical therapy is essential for all patients to alleviate pain and enhance mobility.[37,38]

Conclusions

Specific complications, like dorsal pterygium, nail splitting, and acquired malalignment, require precise surgical techniques to prevent permanent damage to the nail matrix and bed. Non-specific complications, including hematoma, infections, and rare cases of fingertip necrosis or CRPS I, demand meticulous preoperative planning, intraoperative care, and postoperative management.

Preventive measures, such as limiting biopsy sizes, using proper instruments, and educating patients on wound care, are crucial to reducing the likelihood of these complications. Techniques like nail bed shortening, proximal relocation, or bone grafting offer effective solutions for managing deformities such as hook nails. Furthermore, adherence to evidence-based guidelines, including the use of appropriate barriers during surgery and tailored prophylactic antibiotics in high-risk patients, can enhance the outcomes following nail surgery.

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