SURGICAL PROCEDURES IN GENERAL PRACTICE

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DEFORMITIES OF THE NAILS

ONYCHOGRYPHOSIS: INGROWING TOE-NAIL: SUBUNGUAL EXOSTOSIS

BY

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The nail is an epidermal invagination on the dorsal aspect of the terminal phalanges of the fingers and toes. It is composed of two parts: (1) the nail plate or nail proper, and (2) the nail bed, of which the proximal fifth is the matrix from which growth of the nail takes place. The matrix may be recognized by its proximal position, its crescentic shape, and its pale colour. The nail plate is overlain at its proximal and lateral edges by a double fold of skin, while distally the nail overlies the skin. In the case of the great toe it is of supreme importance that both angles should project beyond the lateral skin fold (Fig. 1). In the fingers the nail bed is

FIG. 1.—Normal nail projecting clear of the lateral skin folds.

elliptical in shape, with its long axis in the long axis of the limb. In the toes, on the other hand, the long axis lies transversely, but as years go on the upper limits cease to be convex upwards and the bed may actually become biconcave, so that the highest points of the nail and the matrix lie at the edges. This is a point to be remembered when the nail and its bed are to be removed surgically. In early life the nail plate is smooth, flexible, transparent, and pink in colour. With advancing years the nail becomes rigid, opaque, and brittle, and the colour dull white, grey, or dark yellow. The surface loses its polish and becomes grooved, ridged, or irregular.

These changes depend to some extent on the person's occupation as well as on the care which the hands and feet receive. When they become so extreme as to be obviously pathological the term "onychodystrophy" is appropriate, and both the nail plate and the nail bed are affected. The direct causes of these alterations are (1) the diminishing blood supply of advancing years; (2) inflammations associated with dirt, carelessness, and infection; and (3) general diseases such as thyroid and pituitary deficiency, syphilis, eczema, psoriasis, and nerve diseases such as peripheral neuritis, etc. In association with the achlorhydria of partial gastrectomy or gastro-enterostomy the nails may become spoon-shaped and brittle. In the nails of the feet the pressure of ill-fitting footwear is responsible for changes in the texture and shape of the nails themselves and in the vitality of the underlying nail bed and matrix. It will, however, often be found that after removal of a severely distorted nail the nail bed looks almost normal.

The soft tissues between the nail bed and the distal phalanx are composed of dense connective tissue with a plentiful supply of blood vessels, lymphatics, and nerve endings. Injuries which produce bleeding, and infections causing pus in this confined, vascular, and highly sensitive space, are associated with very severe pain. A collection of either blood or pus may cut off the blood supply, and this will result in necrosis and shedding of the nail.

The function of the nails is to provide protection for the dorsal aspect of the terminal phalanges. This protection is an important adjunct to the tactile sense so highly developed in the pulp of the palmar surface of the fingers. The nails of the fingers also perform the useful function of picking up small objects. In many of the lower animals the nails are used for purposes of attack as well as defence, but this is not a normal function in the human subject.

Onychogryphosis

Where onychodystrophy is associated with hypertrophy and gross deformity of the nail and its bed the affection is termed "onychogryphosis." The disease is rare before middle age, while most of the cases occur in the elderly. The change may be limited to thickening and irregularity of the nail itself or to hyperkeratinization and bulging of the nail matrix which raises the nail plate. In some cases the nail becomes so elongated and curved that its resemblance to a beak or horn is most striking (Fig. 2). While

FIG. 2.—Typical example of onychogryphosis affecting the great toe.

minor degrees of the affection are found in many patients consulting the doctor for other diseases, the deformity can progress to a most surprising extent before it demands serious attention. On occasions it is even viewed with a certain amount of shame, and concealment of the peculiarity is resorted to.

The deformity is almost entirely confined to the feet, and though all the toes may be affected pain and discomfort are usually referred to the great toe only. The changes are slowly progressive, and when pain is complained of this is often due to inflammatory complications. Inflammation is of a chronic character, but it may eventually advance to such a degree as to detach the nail from its bed. It is unusual for acute inflammations to arise in the same way as they do in cases of ingrowing toe-nail.

A recent case of onychogryphosis of many years' standing occurring in a patient suffering from acrocyanosis showed the affection in all the toes of both feet, but only the two great toes and the middle toe of the right foot were causing pain and required radical treatment.

Treatment of Onychogryphosis

Minor degrees of this condition producing few symptoms and uncomplicated by infection can be treated conservatively. Frequent soaking and scrubbing with soap and hot water, followed by trimming the nails with nail clippers or strong nail scissors and levelling the nail plate with sandpaper, will often in a few weeks afford considerable relief and comfort. Special shoes with soft uppers and adequate room for the toes should also be provided.

In more advanced cases it will be found necessary to remove the affected nail and afterwards to treat the new nail as it grows by frequent bathing, trimming, and sandpapering.

In still more advanced cases, and especially in those showing suppuration beneath the nail and gross irregularity of the nail and nail bed, more radical methods will be found necessary. Two courses are open: either to remove the nail and nail bed completely and leave the raw surface to granulate, or, where the condition occurs in youngish patients and it is necessary to restore full capacity for work in the shortest space of time, to perform a partial amputation of the toe in a manner which will be described at the end of this article. When gross infection is present this should be done in two stages: (a) avulsion of the nail and (b) partial amputation of the terminal phalanx.

Onyxis or Ingrowing Toe-nail

The term "ingrowing toe-nail" is applicable only to the great toe. The ingrowth occurs most frequently at the medial edge of the nail, but may be found laterally in cases of hallux valgus where the great toe is overlain by a congenitally elongated second toe. The condition is often predisposed to by a congenital malformation (Fig. 3), but is finally determined by faulty trimming of

FIG. 3.—Congenital deformity of the nail prone to become ingrowing.

the affected nail in persons who habitually wear narrow-toed shoes. The sequence of events is as follows:

1. Pressure of the shoe causes some irritation at the edge of the nail. This is usually noticed soon after trimming the nail.
2. The patient, recognizing the effect of pressure and thinking that removal of the angle of the nail will give relief, proceeds to cut this corner away.
3. The new angle of the nail so formed now lies underneath the peri-ungual skin, which is compressed between the nail and the shoe. This results in a tiny ulcer under the lateral skin fold.
4. Infection follows the ulceration, and a small abscess burrows beneath the nail edge. This stage will be accompanied by severe exacerbation of pain and by swelling and redness of the adjacent parts of the toe.

5. This abscess may extend under the nail and wholly detach it from its bed (onychia), it may extend proximally along the nail margin (onychia lateralis), or it may burst through the skin, producing a sinus which refuses to heal and is marked by a small mass of granulation tissue and a persistent but scanty discharge. It is at this stage that advice is usually sought.

Such is the course of ingrowing toe-nail in its simplest form. It is usually found in a young and active patient, with the nail normal in other respects.

From this description it will be inferred that the infection is not in itself a serious menace to the patient's life or to the integrity of the toe. Such, however, is not always the case, and virulent infections may spread within the toe to the extent of causing necrosis of the phalanx or even an acute lymphangitis affecting the limb. Such cases demand careful handling, but their treatment lies beyond the scope of the present article. Often, too, and especially in older patients, it is associated with other changes and digressions from the normal. These are in the main due to abnormalities in the nail, the result of advancing years, the pressure of ill-fitting footwear, and lack of care in the matter of cleanliness. They may be stated as follows: (1) A rigid nail which seems too broad for the space between the lateral folds of the skin. This produces infolding of the nail edges, which sink deeply into the soft tissues. (2) A longitudinally or irregularly ridged nail, which is really an example of commencing onychodystrophy. (3) A nail which is overlain by skin at all its margins—proximal, distal, and lateral—a deformity either of congenital origin or due to the wearing of shoes that are too short or too narrow.

Treatment of Onyxis

Prevention.—The first necessity is provision of suitable shoes with straight inner sides and broad enough to prevent pressure on the medial side of the great toe. They should, however, fit closely around the ankle and waist of the foot to keep the foot from sliding forward. It must not be forgotten that some nails are congenitally prone to become ingrowing. They will, however, not do so if the free edge of the nail is allowed or persuaded to project beyond the skin of the lateral groove. Where such projection is absent, either congenitally or from overzealous trimming, the angle should be raised over a thin layer of cotton-wool, carefully inserted after disinfection of the area with methylated spirit or weak tincture of iodine. This dressing should be retained until the nail edge projects clear of the skin. The desired result may be facilitated by sandpapering the dorsum of the nail until it becomes thin and pliable.

Where ingrowing has already occurred but where there is no inflammatory change the foregoing method may be sufficient to check extension of the faulty process. The patient should, however, be warned to abstain from cutting away the angle of the nail as growth occurs outwards. To protect the stockings the nail should be gently smoothed with sandpaper, but the angle must not be removed completely.

Where ulceration or abscess formation has already taken place it will be necessary, for efficient drainage, to remove the whole or part of the affected nail, with its nail bed. Unless the nail bed in the affected area be removed regrowth of the nail will be followed by a recurrence both of the deformity and of the symptoms.

In long-standing cases of ingrowing toe-nail where there is considerable destruction of the nail bed and the adjacent soft parts from suppuration even more radical treatment

may be necessary. This may be carried out in two stages: (a) the removal of the nail to provide free drainage for the infection, and (b) a partial amputation of the terminal phalanx, to be described later.

Subungual Exostosis

Subungual exostosis, though not, strictly speaking, a disease or deformity of the nails, is so closely allied to them in position, results, and treatment that its discussion in the same connexion can be fully justified. This condition is a simple growth arising from the dorsal surface of the distal phalanx, usually of the great toe. Its presence is detected in early adult life, but many authorities are of opinion that its development dates from infancy. It begins either as a chondroma or a dense fibroma in which ossification and calcification have taken place. The tumour is not in itself painful, but its increase in size within the narrow space in which it grows causes pressure and eventually raises the nail from its normal position and the tumour peers out underneath it, either in the middle line of the toe or to one or other side. Though superficially the appearance resembles a minor degree of onychogryphosis the nail and nail bed are not involved in the growth but are merely displaced by it. Secondary changes arise from interference with the nail growth or from infection, and the latter may result in severe pain.

Treatment consists in avulsion of the whole or part of the nail, with removal of the tumour, which must be freely gouged out of the bony phalanx.

Operations

The operative procedures for the treatment of the foregoing affections may be summarized as follows: (1) Avulsion of a nail with or without removal of the whole or part of the nail bed. (2) Avulsion of a nail followed at a later date by amputation of the distal part of the terminal phalanx. (3) Avulsion of a nail or part of it with removal of an exostosis by a bone gouge. The details of the operations are as follows.

Disinfection.—The feet should be scrubbed thoroughly in a bath the night before and on the morning of operation. Further disinfection should be carried out on the operating table by ether, followed by tincture of iodine.

Instruments.—A 10 c.cm. Record syringe with a fine hypodermic needle. Three pairs of Spencer Wells artery forceps. One pair of strong scissors with one sharp blade. A stout scalpel. A pair of toothed dissecting forceps. For partial amputation of the toe, in addition, a Gigli saw or a sharp bone-cutting forceps, fine cutting needles, and fine silkworm-gut. For removing an exostosis, a small sharp bone gouge.

Anaesthesia.—All these operations may be performed under local anaesthesia, using 2 per cent. novocain. For premedication an ampoule of omnopon is given hypodermically half an hour before the time of operation. Anaesthesia is produced by a combination of blocking of the digital nerves at the base of the toe with infiltration anaesthesia at the line of the incision. The nerve block requires 2 to 3 c.cm. of the solution to be injected in the region of each digital nerve. Infiltration is produced by injecting (1) the skin and subcutaneous tissues around the edge of the nail, (2) the nail bed, and (3) the periosteum of the bone if this is to be divided. For the whole operation 20 to 30 c.cm. of novocain will usually be sufficient.

Avulsion of the Nail.—With the scissors held flat the sharp blade is inserted under the distal nail edge and

pushed proximally until the point reaches the upper limits of the nail—that is, about a quarter of an inch beyond the proximal skin fold. The scissors are then rotated through a right-angle and the nail is divided into two portions. Each of these is caught in turn by a pair of Spencer Wells forceps, which are rotated outwards from the centre of the nail until the fragment becomes free. The edges of the wound are disinfected with tincture of iodine and the wound is dressed with sterile vaselin gauze, covered by a thin layer of cotton-wool and a firm bandage. Healing takes place by granulation.

Onyxia.—For onyxia only the affected part, usually about one-third of the nail, is removed. This is followed by complete excision of the corresponding part of the nail bed and the overhanging part of the skin fold, making sure that the whole of the nail matrix at the upper angle has been removed.

Onychogryphosis.—After the production of anaesthesia the nail may be removed complete, especially if, as is usual, partial separation has already taken place either by traumatism or by inflammation. In some cases, however, it may be necessary to mobilize one edge with a scalpel in order to obtain a firm grasp of the nail.

Subungual Exostosis.—Anaesthesia with novocain, as already mentioned for avulsion of the nail, is the method in use. Part or the whole of the nail is avulsed, the amount depending on the size and position of the exostosis. After this has been removed a sharp bone gouge is thrust into the phalanx around the new growth, which is thus mobilized with a thin layer of the bone adjacent to it.

Partial Amputation of the Distal Phalanx.—For amputation of the distal phalanx the technique for anaesthesia is identical with that for avulsion, but in addition it is necessary to infiltrate the soft tissues close to the periosteum at the level at which the bone is to be divided. Within a few minutes of injection an incision is made transversely across the dorsum of the toe and extending just clear of the nail at the sides. It should be placed half an inch proximal to the highest point of the skin fold and should go down to the underlying bone. At right angles to the extremities of this another incision is made surrounding the nail and nail bed and marking out a plantar flap of skin and subcutaneous tissue. The flap is dissected back to its base so as to expose the plantar surface of the phalanx as far as the level of the first incision. The bone is divided at this level with a sharp bone-cutting forceps or a Gigli saw. In this way the base of the phalanx with the insertions of the long flexor and long extensor tendons is left *in situ*. The plantar flap is, if necessary, adapted to cover the raw surface neatly. Three or more mattress sutures of fine silkworm-gut are put in to control bleeding and close the wound (Fig. 4). This operation provides a radical cure for any

FIG. 4.—Diagrammatic representation of operation for partial amputation of the terminal phalanx.

of the deformities and diseases arising in connexion with a nail. It gives excellent cosmetic and functional results and, if performed after the acute inflammation has been got rid of by adequate drainage, heals rapidly by primary union.