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We hope that making available the relevant information on Pachyonychia Congenita will be a means of furthering research to find effective therapies and a cure for PC.
THE LONGITUDINAL NAIL BIOPSY*

NARDO ZAIGAS, M.D.

Nail study material is usually obtained from autopsy or surgical specimens. Biopsy material obtained by routine punch technics is completely unsatisfactory, not only because of the loss of orientation of the specimen, but also because only one nail structure can be biopsied at one time. A biopsy technic is described for use in patients which permits the study of the pathological state of the nail at the time of the biopsy as well as of the past 3-4 months as it is reflected in the nail plate. It also provides information on the behavior of the nail bed, proximal nail fold, and matrix after surgical intervention.

METHODS

Digital nerve block is accomplished by the subcutaneous injection of 1 or 2% lidocaine, laterally in the vicinity of the distal interphalangeal joint. A sterilized single edged razor blade is used to make 2 parallel incisions from the proximal nail fold to the tip of the finger (Fig. 3A). The distance between these incisions should never exceed 3 mm or severe scarring will result. The tip of the blade should gently glide over the bony phalanx. The shorter sides of the rectangle are then cut with a very sharp scalpel. With the aid of a slightly curved iris scissors, beginning at the tip of the finger and being careful to have the scissors' tip on the dorsal surface of the bony phalanx, the outlined nail sample is dissected. A longitudinal piece of tissue is obtained. A histologic section of such a specimen is shown in Fig. 4. No sutures are used since this may disturb the normal shape of nail and may lead to ingrown nails. Bleeding can easily be controlled by grasping the digit laterally and occluding the lateral digital arteries. A bulky bandage is applied, left in place for 4-5 days, and removed. A band-aid will suffice thereafter.

RESULTS

Thirty biopsies involving the matrix have been performed: 17 were of the longitudinal type, in only 2 was there excessive scarring. This resulted from the excision of tissue wider than 3 mm (Fig. 3C). Minimal scarring results from a biopsy 2 mm or smaller (Figs. 1 and 2). Surprisingly, patient discomfort is minimal; only slight throbbing and an awareness of the finger is experienced. This procedure is not recommended in patients with diabetes, scleroderma, or vascular diseases. Patients with psoriasis heal rapidly.

The nail specimen should be fixed in a solution containing 5% trichloroacetic acid and 10% formalin. This fixative is superior to just formalin, leaving the nail plate softer and

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Fig. 2. Normal scarring

Fig. 3A. Normal great toe, 10 day 3 mm.

Fig. 3B. Two months after Fig. 3C. Scarring of matrix

Fig. 1A. Psoriasis, finger nail
Fig. 1B. Finger 4 weeks after biopsy
Fig. 1C. Finger 4 months after biopsy
harp scalpel. With the aid of a slightly curved scissors, beginning at the tip of the nail, being careful to have the scissors' tips parallel to the bony surface of the bony phalanx, the outer part of the nail plate is dissected. A longitudinal piece of nail is obtained. A histologic section of such a nail is shown in Fig. 4. No sutures are used; the nail may disturb the normal shape of nail and leave ingrown nails. Bleeding can be controlled by grasping the digit laterally and occluding the lateral digital arteries. A bulky bandage, left in place for 4-5 days, and re-bandaging after that will suffice thereafter.

RESULTS

Nail biopsies involving the matrix have been performed: 17 were of the longitudinal type and only 2 were transverse; the former were more frequent, resulting from the excision of tissue wider than 3 mm (Fig. 3C). Minimal scarring results from a biopsy 2 mm or smaller (Figs. 1A-1C). Surprisingly, patient discomfort is minimal. Only slight throbbing and an awareness of the finger is experienced. This procedure is not recommended in patients with dermatological or vascular diseases. Patients heal rapidly. All specimens should be fixed in a solution containing 5% trichloroacetic acid and formalin. This fixative is superior to saline, leaving the nail plate softer and easier to handle.

Fig. 2. Normal finger, 1 year after biopsy. Slight scarring

Fig. 3A. Normal great toe, 10 days after biopsy. Width of tissue removed is greater than 3 mm.

Fig. 3B. Two months after biopsy. Proximal nail fold completely healed

Fig. 3C. Scarring of matrix results in disfigured nail, 5 months after biopsy

Fig. 4. Nail biopsy obtained from patient in Fig. 1A, H&E × 13
less brittle. Specimens can be processed by routine alcohol-paraffin histologic technics, but a modification of a polyethylene glycol-pyroxylin embedding technic is recommended (1).

SUMMARY

A nail biopsy technic for use in carefully selected patients and volunteers is described.

Surgery of the nail bed and matrix area can easily be done with minimal scarring and discomfort if the width of the nail specimen at the matrix area never exceeds 3 mm.

REFERENCE


A MODIFIED POLYETHYLENE GLYCOL-PYROXYLIN METHOD SP

RALPH A.

Processing hard keratinous structures such as hair and nails with ordinary alcohol-paraffin methods is a tedious taking requiring the cutting of numerous, few of which are acceptable. A modification of the water-soluble wax embedding method, previously described in dermatology and other fields (1-6) is offered a simple and routine method. It preserves excellent cytologic fixatives and eliminates many of the technical errors both by the nail and by the polyethylene glycol waxes themselves.

MATERIALS

Fixative: It is often experienced that a 10% formalin solution as the sole routine histologic study. A solution of 40% formaldehyde (T.C.A.) and 10% glutaraldehyde renders a well-fixed nail which is less brittle. Fixation should be for 24 hours. This fixative should not be used when DNA are planned, since it will alter the structural. Specifically, it should not be used in autoradiographic studies where radionucleotides are used for incorporation into DNA.

Embedding mixture: This consists of 2 parts polyethylene glycol (p.e.g.) and 2 parts pyroxylin (Parlodion) strips in a low-temperature oven at 56°C.

Pyroxylin solution: dissolve 10% by weight pyroxylin (Parlodion) strips in a low-temperature oven at 56°C.

The final embedding mixture is prepared by mixing an equal volume of the p.e.g. and the pyroxylin solution. Place in a 1-ml beaker, mix well and leave over 56°C oven. This will allow the acetone to evaporate and also get rid of trapped air bubbles. Gelatin subbed microscope slides are ready for use.

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