Surgical Excision of Pedunculated Supernumerary Digits Prevents Traumatic Amputation Neuromas

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Abstract: Nine patients divided into two groups were treated for pedunculated supernumerary digits or their sequelae. The first group consisted of three patients who had among them five traumatic amputation neuromas. In each case these lesions resulted from primary suture ligation of accessory digits in infancy. Secondary surgical excision of the vestigial digit with high ligation and retraction of the accompanying nerve tissue was required in all cases. The second group consisted of six patients who had 12 pedunculated supernumerary digits. Primary surgical excision of these digits was performed with high transection and retraction of the accompanying accessory digital nerve. All patients in this group had excellent cosmetic results with no postoperative neuroma formation. Adult family members who had undergone suture ligation of similar supernumerary digits in infancy accompanied seven of the nine patients in this series. On careful examination, each of these family members had signs and symptoms attributable to traumatic amputation neuromas. We feel identification and high transection of the accessory digital nerve is essential in the treatment of pedunculated supernumerary digits. This treatment prevents traumatic amputation neuromas and yields a better cosmetic result than the traditional method of suture ligation in infancy.

The standard clinical practice of simple suture ligation of pedunculated supernumerary digits has been performed for years (1). Many of these patients later present with so-called rudimentary polydactyly, which subsequently is excised. Similar lesions have also been noted in patients without history of prior ligation. Histologic studies support that these lesions are a result of traumatic amputation (in utero or by suture ligation) and not the result of an abortive attempt to form a sixth finger (1–3). Several patients with symptomatic rudimentary polydactyly after suture ligation of a supernumerary digit have been observed in Dr. Gosain’s practice.

Histologic studies after surgical excision of the rudimentary digit have confirmed neural proliferation consistent with amputation neuromas. Careful history has revealed similar lesions in parents of affected children, all of which were treated in infancy with suture ligation alone, since this was the only treatment offered at the time. When examined, the affected parents often have considerable sensitivity in the area of the amputation neuroma, with some complaints of intermittent ulceration and bleeding from the residual stump. We propose that surgical excision of pedunculated supernumerary digits with high transection and retraction of the digital

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METHODS AND RESULTS

Amputation Neuroma Population

Three patients presented with traumatic amputation neuromas after simple suture ligation of supernumerary digits in infancy, with two patients having bilateral neuromas. Surgical excision of all five neuromas was performed. An elliptical incision was made along the long access of the digit and the accessory digital nerve was then dissected free from the surrounding tissues. The accessory nerve was divided proximally and allowed to retract into the soft tissues in all cases, with care taken not to injure the proper digital nerve. Histologic examination confirmed the presence of nerve tissue in each case.

Case Reports

Patient 1. A 4-year-old girl was referred for evaluation of vestigial remnants of supernumerary digits bilaterally. The patient had bilateral supernumerary digits of the little fingers tied off in infancy. She had since had irritation of both digits with tenderness and irregularity of the ulnar aspects of the digits. Examination revealed a small tender mass on the ulnar aspect of the little finger at the base of the proximal phalanx bilaterally (Fig. 1A). The lesions were surgically excised as described above (Fig. 1B). Histologic examination showed nerve bundles and laminated nerve endings (Fig. 1C). The scars have been asymptomatic without recurrent neuroma formation over a 3.5-year follow-up.

Patient 2. A 1-year-old boy presented with a residual lesion on the radial aspect of the right thumb at the metacarpophalangeal (MP) flexion crease. A pedunculated supernumerary digit had been suture ligated at that site shortly after birth. The family noticed the unsightly residual lesion and wished to have it excised. The patient underwent surgical excision of the vestigial digit and accompanying neuroma. Histologic examination of the lesion confirmed the presence of nerve fiber bundles consistent with a traumatic amputation neuroma. Excision resulted in an excellent cosmetic result without neuroma recurrence over a 2.5-year follow-up.

Patient 3. A 13-year-old girl had a mass 5 mm in diameter on both little fingers at the ulnar aspect of the proximal phalanx (Fig. 2). These lesions were noted in infancy after suture ligation of supernumerary digits arising from this location bilaterally. The patient was bothered by the appearance of these lesions and therefore surgical excision was performed. Histologic sections showed a thickened corneum and a nodule in the dermis composed
of irregularly arranged nerve bundles separated by fibrous tissue. These findings were consistent with traumatic amputation neuromas. She is pleased with the results and has had no recurrent lesions over a 5.5-year follow-up.

Supernumerary Digit Population

Between January 1996 and July 1998, six patients with 12 supernumerary digits (Fig. 3A) underwent excision of the vestigial digit and accompanying neural tissue. This was performed as noted above, with isolation and high transection of the accessory digital nerve, allowing the proximal end of the accessory digital nerve to retract into the soft tissue. These patients are summarized in Table 1. Careful history often revealed family members with unsightly symptomatic amputation neuromas after suture ligation of supernumerary digits when they were children (Fig. 3B). In all cases the patient and family members were pleased with the cosmetic results after surgical excision. There were no postoperative amputation neuromas on follow-up examinations up to 6 years later.

Family Members

Seven of the nine patients (three with amputation neuromas and four referred for primary treatment of supernumerary digits) had parents or grandparents with a history of supernumerary digits who were available for examination. An example of one such parent is shown (Fig. 3B). In all of these adult relatives, the supernumerary digits were removed by suture ligation in infancy. The affected relatives were carefully examined for signs and symptoms of amputation neuroma in the vestigial remnant of the supernumerary digit. All demonstrated one or more of the following in the vestigial remnant: 1) discomfort on pressing or hitting the remnant disproportionate to that felt in the remaining digit, 2) tingling on tapping the vestigial remnant, 3) irritation when sliding the hand into a pocket, and 4) intermittent bleeding or ulceration. Surprisingly none of the family members complained of these findings unless questioned, since they uniformly felt that this was something they had to live with and there were no good alternatives available. For this reason, none had sought additional treatment.

DISCUSSION

Polydactyly can range from a vestigial member to a near normal finger (4). Incompletely formed fingers frequently present as a glbose or a slightly elongated mass attached by a very slender pedicle to the ulnar aspect of the hand. These masses are frequently referred to as pedunculated postminimus and often contain a nail or a tiny mass of cartilage and nerves (1,5). The true incidence of
### Table 1. Surgical Excision of Supernumerary Digits

<table>
<thead>
<tr>
<th>Patient</th>
<th>Surgical date and age</th>
<th>Sex</th>
<th>Location</th>
<th>Family history</th>
<th>Histology</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1/18/96; 10 weeks</td>
<td>M</td>
<td>LF B/L, ulnar middle phalanx</td>
<td>Maternal great grandmother and paternal great uncle with accessory digits</td>
<td>Gross only</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
<tr>
<td>5</td>
<td>2/28/96; 3 months</td>
<td>M</td>
<td>Left LF, ulnarPIP flexion crease</td>
<td>Two siblings, father, and paternal uncles with accessory digits</td>
<td>Gross only</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
<tr>
<td>6</td>
<td>5/29/96; 3 weeks</td>
<td>F</td>
<td>LF B/L, ulnar MP flexion crease</td>
<td>None</td>
<td>Hyperkeratosis with proliferation of neural elements</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
<tr>
<td>7</td>
<td>5/11/98; 5 months</td>
<td>M</td>
<td>LF B/L, ulnar MP flexion crease</td>
<td>Father and paternal grandfather with accessory digits</td>
<td>Gross only</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
<tr>
<td>8</td>
<td>7/15/98; 2 months</td>
<td>F</td>
<td>LF B/L, ulnar MP flexion crease, right lateral base of fifth toe</td>
<td>Father, paternal grandfather, and aunt with accessory digits (all with poor scarring after digits tied off in infancy)</td>
<td>Gross only</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
<tr>
<td>9</td>
<td>11/4/99; 21 months</td>
<td>F</td>
<td>LF B/L, ulnar MP flexion crease</td>
<td>Father, paternal grandfather, and great grandmother (all with poor scarring after digits tied off in infancy)</td>
<td>Gross only</td>
<td>Excellent cosmetic appearance with no neuroma formation</td>
</tr>
</tbody>
</table>

Six patients who had 11 supernumerary digits excised with high resection of the digital nerves between January 1996 and July 1998 are represented. All cases resulted in an excellent cosmetic appearance with no neuroma formation. In contrast, many family members had similar accessory digits, some of which were suture ligated in infancy with resultant neuroma formation and residual digital remnants. LF, little finger; B/L, bilateral; PIP, proximal interphalangeal; MP, metacarpophalangeal.

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...the predominant pattern of inheritance has been observed and...
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