**Background:** Ingrowing toenail is a common condition treated by general surgeons. Our aim was to analyze the effectiveness of wedge resection with phenolization in the surgical treatment of ingrowing toenails.

**Methods:** We retrospectively audited 100 patients who underwent wedge resection with phenolization for the treatment of ingrowing toenail between January 2000 and June 2004 by a single surgeon. We reviewed all charts and attempted to contact all patients for a telephone interview to assess patient satisfaction. Outcome measures were: 1) recurrence rate, 2) duration of analgesic use, 3) postoperative complications including wound infection, 4) time to return to normal activities, and 5) satisfaction with the procedure.

**Results:** A total of 168 wedge resection with phenolization procedures were performed on 100 patients. There was only one recurrence (0.6%). Two patients (2%) had wound infection and were treated with oral antibiotics. The average time for a single wedge resection with phenolization procedure was 7.3 minutes. The mean time to return to normal activities was 2.1 weeks. The patient response rate for the telephone interview was 60%. Most respondents (93.3%) were satisfied with the overall outcome.

**Conclusions:** Wedge resection with phenolization is a very effective mode of therapy in the surgical treatment of ingrowing toenail, with a very low recurrence rate and minimal postoperative morbidity. Wedge resection with phenolization should be considered as a good alternative technique in the treatment of ingrowing toenail. (J Am Podiatr Med Assoc 98(2): 118-122, 2008)
telephone interview to assess patient satisfaction. An independent, blinded assessor conducted chart reviews and telephone interviews. Our outcome measures were: 1) recurrence rate, 2) duration of analgesic use, 3) postoperative complications including wound infection, 4) time to return to normal activities, and 5) satisfaction with the procedure.

The technique used for wedge resection was similar to that described by Winograd in 1929. The instruments required for the procedure are shown in Figure 1. The toe was prepared with povidone-iodine solution, a tourniquet was applied, and a ring block was inserted using 1% plain lignocaine (Xylocaine; B. Braun, Medical Ltd, Dublin, Ireland). The nail fold on the affected side was incised (Fig. 2). The surgeon used a scalpel to make a longitudinal incision through the entire thickness of the nail and the germinal matrix. The affected portion of the nail with germinal matrix was removed (Fig. 3). Granulation tissue was curetted away (Fig. 4), and any blood in the sulcus was mopped. Particular care was taken to ensure that the complete segment of relevant nail matrix was entirely excised. A cotton bud dipped in 80% phenol was applied to the nail beds in all cases for one minute (Fig. 5). Care was taken to avoid contact of the phenol with the skin. Methylated spirit was applied to neutralize any residual effects of phenol (Fig. 6). The wound was left open for secondary healing, thus avoiding the need for future suture removal. Paraffin gauze pressure dressings were applied, and the tourniquet was released. Patients stayed in the recovery area for 30 min with the foot elevated and were discharged with instructions to keep the foot elevated for 24 hours and to use analgesics if required. The public health nurse changed the dressings the day after the procedure. All patients had a 6-week follow-up in the outpatient clinic and were instructed to report in the event of non-healing, infection, or recurrence.

Figure 1. Instruments and materials required for wedge resection with phenolization.

Figure 2. Incision on the nail fold.

Figure 3. Affected portion of the nail and germinal matrix being removed.
Results

A total of 168 WRP procedures were performed on 100 patients with ingrowing toenail, some of whom had both feet treated at once. The male-to-female patient ratio was 1.22:1. The median age was 43 years (range, 8–78 years). Average tourniquet application time was 6.6 min (range, 4–28 min). Table 1 shows the distribution of the duration of each procedure. The average time for a single WRP procedure was 7.3 min. Patients younger than 10 years old received general anesthesia (27 procedures).

Chart review of all 100 patients confirmed only one recurrence (0.6% recurrence rate). Most of the patients used nonsteroidal anti-inflammatory drugs for 2 to 3 days for pain control. Only six patients (6%) required these drugs for more than 1 week. Two patients (2%) had wound infection and were treated with oral antibiotics.

Out of the 100 patients, 60 (105 procedures) responded to the telephone interview. All but four pa-

<table>
<thead>
<tr>
<th>Table 1. Wedge Resection with Phenolization Procedures Performed per Patient and Average Durations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of WRP Procedures Performed on Patient (N = 100)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

Abbreviation: WRP, wedge resection with phenolization.
Patients were satisfied with the procedure (93.3% satisfaction rate). Figure 7 shows the preoperative appearance of the ingrowing toenail, and Figure 8 shows the light pressure bandage after wedge resection with phenolization. Only one patient had a recurrence requiring further surgery. This patient had one recurrence after having four WRP procedures done on both halluces. This recurrence was resolved with a repeat WRP procedure. The time patients took to return to normal activities ranged from 5 days to 6 weeks (mean, 2.1 weeks) and was longer in patients having four procedures in one sitting.

Discussion

The literature describes many techniques for the treatment of ingrowing toenails, but there is no uniformly acceptable standard mode of treatment for this common problem. A successful procedure should be simple and should have at least the following outcomes: minimal recurrence rate, return to normal footwear within 1 week, and no pain on weightbearing.\textsuperscript{5}

Recurrence of ingrowing toenail is very high for conventional treatment methods (those that do not destroy the germinal matrix).\textsuperscript{1, 2, 6} Simple nail conservation treatment, such as the approach described by Lloyd-Davies and Brill,\textsuperscript{2} is easy to undertake but is time consuming and requires prolonged patient cooperation. The failure rate is also high, with recurrences in 45% of those treated. Nail strip and total nail avulsion similarly result in unacceptably high failure rates, reported to range from 64% to 86%.\textsuperscript{1}

Wedge resection alone has recurrence rates between 1.7% and 30%, depending on the experience of the operating surgeon.\textsuperscript{3} Wedge resections performed by inexperienced, junior members of the surgical team reportedly result in higher recurrence rates.\textsuperscript{5, 7} Greig et al\textsuperscript{8} report that phenolic ablation of the nail (by causing a chemical burn at the nail matrix) has a success rate of 90%.

Fulton et al\textsuperscript{3} report a recurrence rate of less than 5% for the combined treatment of wedge resection and segmental phenolization. Our results indicate that a recurrence rate of 0.6% is achievable with WRP. Our results also indicate that the morbidity with this procedure is minimal. More than one WRP procedure can easily be performed at the same time. The procedure is quick, and the phenolization adds 1 min to the operative time and has a negligible cost.

Wedge resection combined with phenolization is a very effective mode of therapy in the surgical treatment of ingrowing toenail, with a very low recurrence rate. The technique is simple, safe, and easy to perform with minimal postoperative morbidity.

Financial Disclosures: None reported.
Conflict of Interest: None reported.
References