Acquired melanocytic nevi are a well-known risk factor in the development of melanoma; their increased frequency is associated with increased risk. Many recent studies have focused on the dermoscopic diagnosis of melanoma in addition to investigation of nevogenesis.\(^1\)\(^2\) However, the clinical appearance of nevus orientation has not been a target of investigation. Although not aiming to identify new phenomena, we attempt herein to quantify and explain the orientation patterns of acquired melanocytic nevi on the back. Blaschko lines are a well-described pattern of skin lines that correlates with epidermal nevi and may relate to acquired melanocytic nevus orientation.\(^3\) Quatresooz et al.,\(^4\) while investigating lines of tension in skin on the back, identified a dermoscopic parallel melanotic line pattern on the normal skin of the back aligned with skin tension lines called Langer lines.\(^4\) We propose that a pattern of acquired melanocytic nevus orientation is identifiable and may be associated with both Blaschko and Langer lines.

Methods. Our study protocol was approved by the University of Queensland ethics board (project No. 2009001590). To investigate the observed orientation of melanocytic nevi on the back, we assembled a cohort of 20 white participants (10 women) recruited from the Dermatology Outpatients Department at the Princess Alexandra Hospital, Brisbane, Australia. Each participant underwent full-body imaging (FotoFinder machine; FotoFinder Systems GmbH) and subsequent dermoscopic imaging of all nevi greater than 5 mm in diameter on their back. Each nevus was analyzed, and its long-axis length and total area were recorded. The nevi’s longest axis was used to assess its angle of orientation with reference to the patient’s midline. Measurement of each nevus’s eccentricity (“ovalness”) was then calculated for correlation of nevus shape with other recorded parameters.

Each back image was cropped based on common surface landmarks to include the base of the neck to the natal cleft and scaled to a standard size of 1500 × 2500 pixels (Figure 1). The coordinates of each nevus were recorded in addition to the angle of orientation from the vertical axis of the spine (range, 0°-360°) measured as shown in Figure 2.

Results. The median age of our cohort participants was 47 years. Our analysis included data from 440 individual nevi in total. Nevus orientation was investigated in relation to vertical and horizontal position of the back. Figure 3 demonstrates the recorded orientation corresponding to vertical displacement as a fraction of the dis-
1.0
0.8
0.6
0.2
0.0
200
150
100
50
0
Normalized Vertical Position
Naevus Angle, Degrees
Figure 3. Individual naevus angle is shown to be dependent on vertical position on the back. Individual naevi are represented by the black dots. The curving trend line indicates a predictive model relating naevus angle to vertical position on the back following the quadratic equation

\[ y = -213.3x^2 + 162.3x + 121.4. \]

tance from neck to natal cleft. Statistical analysis revealed a quadratic relationship between naevus orientation and vertical position, with a coefficient of determination of \( R^2 = 0.61 \).

No relationship was observed between horizontal position and naevus angle, but all recorded lesions had an angle between 80° and 180°. No relation was found between horizontal position and size or vertical position and size. Additionally, the angle of orientation did not show any association to any measurement of acquired melanocytic naevus size or shape.

Comment. Through full-body imaging, we observed a specific and reproducible pattern of acquired melanocytic naevus orientation and have confirmed this observation by identifying a mathematical model relating naevus orientation to vertical location on the back. Given the documented correlations between Blaschko lines, Langer lines, and previously described epidermal lesions and pigmentation patterns, we hypothesized that a relationship may exist between naevi orientation and either Blaschko lines or Langer lines.

Our investigation of the relationship between acquired melanocytic naevus orientation and Blaschko lines was not supported by our data. If this association did exist we would observe a V shape centered along the spine typically seen in conditions allowing visualization of Blaschko lines. This was not present in our analysis.

Conversely, our orientation data did reasonably match Langer line patterns. Compilation of our data into a composite patient allowed visual comparison of our recorded data and Langer lines. The correlation between our data and Langer lines on the back can be seen in an image overlay in Figure 4. We conclude that acquired melanocytic naevi on the back are aligned with Langer lines, and the correlation is independent of size and eccentricity.

This quantification of naevus orientation has given strength to the hypothesis that acquired melanocytic naevi align with Langer lines. This may lead to a better understanding of the underlying factors involved in naevus growth.

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A Comparison of High- and Low-Cost Infection-Control Practices in Dermatologic Surgery

Though several studies have examined infection risk in dermatologic surgery, studies comparing costs of different infection control protocols are lacking. This study was undertaken to determine whether a low risk of infection could be maintained with a low-cost infection-control protocol.

Methods. A prospective study of 573 consecutive patients with 670 tumors undergoing Mohs surgery with same-day reconstruction or second-intention healing evaluated whether a low rate of surgical site infection (SSI) could be maintained with a low-cost infection-control protocol. Surgical site infections were tracked from January through September 2010 in a single-surgeon academic Mohs practice (termed low-cost group), and these were compared with those from a previously published group of 585 cases in which the infection rate had dropped from 2.5% (the practice’s initial infection rate) to 0.9% with initiation of a more stringent but expensive infection-control protocol (high-cost group). The infection-control protocols investigated are summarized in Table 1. The study was approved by the Partners Human Research Office.

![Table 1](https://example.com/table1.png)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Initial Protocol Used in the Practice (2.5% Infection Rate)</th>
<th>High-Cost Protocol (0.9% Infection Rate)</th>
<th>Low-Cost Protocol (0.7% Infection Rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jewelry restrictions</td>
<td>None</td>
<td>Smooth wedding band only, no cost</td>
<td>Smooth wedding band only, no cost</td>
</tr>
<tr>
<td>Surgical caps</td>
<td>None</td>
<td>Caps used, $0.03</td>
<td>Caps used, $0.03</td>
</tr>
<tr>
<td>Mohs excision</td>
<td>Soap and water, negligible cost</td>
<td>CG-EA, $0.84</td>
<td>CG-EA, $0.84</td>
</tr>
<tr>
<td>Staff hand wash</td>
<td>Clean, negligible cost</td>
<td>Sterile, $2.92</td>
<td>Clean, negligible cost</td>
</tr>
<tr>
<td>Gloves</td>
<td>None</td>
<td>Sterile paper drape, $1.59</td>
<td>Sterile paper drape, $1.59</td>
</tr>
<tr>
<td>Staff hand wash</td>
<td>CG-EA, $0.84</td>
<td>Sterile, $2.92</td>
<td>Sterile, $2.92</td>
</tr>
<tr>
<td>Gloves</td>
<td>Sterile towels, negligent cost</td>
<td>Sterile half sheet, $1.06, and sterile towels, negligent cost</td>
<td>Sterile towels, negligent cost</td>
</tr>
<tr>
<td>Drape</td>
<td>None (exposed arms), no cost</td>
<td>Sterile knee length, $4.42</td>
<td>Long-sleeved scrub tops, negligible cost</td>
</tr>
<tr>
<td>Total Cost per Case</td>
<td>$3.76</td>
<td>$14.62 ($10.86 increase over initial protocol)</td>
<td>$6.22 ($2.46 increase over initial protocol)</td>
</tr>
</tbody>
</table>

Abbreviation: CG-EA, chlorhexidine gluconate, 1%, and ethyl alcohol, 61%.

$^a$From hospital linen supply.

Figure. Criteria for a diagnosis of infection and initiation of antibiotic therapy. The same criteria were used for both sutured wounds and those healing by second intention.

Infection was defined as any case in which antibiotic therapy was used for suspected wound infection. Criteria for determining the presence of infection and initiating antibiotic therapy are summarized in the Figure. Patients were seen for suture removal or for wound check (in cases of second-intention healing) at postoperative day 7 to 10. The presence or absence of infection was assessed at this visit. In addition, all patients were given an instruction sheet on the day of surgery describing symptoms of infection (redness, pain, swelling, fever, or pus) with instructions to come to the office for evaluation if these symptoms occurred. Wounds were cultured before antibiotic therapy was begun in all cases. Surgical skin preparation differed between groups because chloroxylenol, 3%, became commercially unavailable during the study period. This likely had little impact on results because the efficacy of chloroxylenol and iodine skin...