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# The natural history and spontaneous resolution of keloid scars



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## KEYWORDS

Keloid;  
Scar;  
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**Summary** *Introduction:* There is limited information available on the natural history and prognosis of keloid scars.

*Aim:* To evaluate how keloid scars behave over time to develop prognostic information for patients.

*Materials and methods:* 34 patients in Manchester and Barbados (average age 34 years) yielding 126 keloids completed questionnaires about their lesions.

*Results:* 46 keloids (37%) were described by patients as resolved, meaning they were satisfactory in appearance, not symptomatic and not requiring treatment. In each case the scar remained visible. 36 (29%) lesions resolved following treatment. Ten (8%) resolved spontaneously. The median number of years to resolution with treatment was 11.4 and to spontaneous resolution was 5, this difference was statistically significant ( $p < 0.05$ ). The median number of years since resolution with treatment was 3 and since spontaneous resolution was 18, this difference was statistically significant ( $p < 0.0001$ ). Seventeen lesions (13%) were resolving with treatment. 63 (50%) remained active. Overall the median number of years scars persisted was 15.

*Conclusion:* Keloids never completely disappear to leave skin with normal texture, however they can resolve (flatten and soften) so they no longer burden patients in approximately one third of cases. Scars resolving spontaneously do so early in the disease. Those that don't may resolve after many years of treatment. This data can provide prognostic information to patients, and a baseline for future therapeutic trials.

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## Introduction

Keloid disease is a very disfiguring disorder which can be a significant physical, emotional and psychological burden for patients,<sup>1–5</sup> particularly as lesions are often found in visible areas.<sup>3</sup> They are generally classified as a form of scarring although many patients can not recall any injury or infection that precipitated the onset. They should be distinguished from hypertrophic scars which raise above the surface but proceed to early resolution, although exact time frames vary from author to author.<sup>6–9</sup> The pathognomonic feature of a keloid is invasion of surrounding dermis. The highest incidence is in people aged 10–30 years<sup>10–12</sup> who are most likely to be concerned about their appearance. Despite this, and the fact that in black patients the disease is the fifth commonest dermatological disease in the UK,<sup>13</sup> the disease remains poorly understood and inadequately treated. Many treatment options are available however none are reliably evidence based. Recurrence rates remain high<sup>14–16</sup> and there is currently no gold standard therapy.<sup>15–17</sup> Furthermore there is a lack of high quality research on therapeutic options.<sup>18</sup> Major reasons for this may be the limited understanding of the exact cause and nature of the disease<sup>17,19</sup> and the lack of definitive characterisation of what constitutes a keloid scar.<sup>17</sup>

The uncertainty and limited knowledge of the disease by clinicians may contribute to patients being poorly informed about their disease. This may lead them to seek information from inaccurate sources, such as many on the internet, causing them to be misinformed.<sup>20</sup> Although there is much literature evaluating keloid therapies, research detailing the natural history of the disease is extremely limited. It is widely accepted that keloids persist for many years<sup>19,21</sup> and that their growth patterns are highly variable and unpredictable.<sup>8,15</sup> However literature discussing how the scars progress over time and particularly resolution of these scars is limited and often vague.<sup>22</sup> Studies have shown that patients believe the disease to be chronic and that treatment will have limited effect on the appearance.<sup>3,23</sup> However Alonso and Rioja (2011)<sup>24</sup> reported a case of spontaneous regression where the scar remained visible but was no longer a burden to the patient, and many other studies have demonstrated a degree of resolution with treatment. These factors illustrate a lack of understanding of the disease by both clinicians and patients and demonstrate that the lack of available accurate prognostic information with which to provide to patients is a major reason for patients lack of knowledge. From the senior authors experience patients desire much more information upon diagnosis about how their disease will progress over time, but without definitive data the information provided is largely anecdotal.

Therefore the aim of this study was to evaluate the natural history of individual scars to assess how they progress over time and whether there was a chance of resolution, particularly spontaneous resolution. Because our data is intended to provide patients with prognostic information, previous studies have shown that judging outcome from the patient perspective is the most accurate reflection of resolution,<sup>1,3</sup> and this study was therefore based on patient assessment.

## Materials and methods

Patients with keloid disease who attended scar clinics at University Hospital of South Manchester, Manchester, UK in March and April 2013 and general plastic surgery clinics at Queen Elizabeth Hospital, Bridgetown, Barbados in April and May 2013 were asked to answer a set of questions relating to their disease. Thirty-four patients were questioned overall, twenty-two in Manchester and twelve in Bridgetown. These patients had a total of 126 individual keloid scars, 83 from Manchester and 43 from Bridgetown. Informed verbal consent was obtained from each patient before questioning began.

Keloid scars were defined as skin lesions which grew beyond the confines of the original wound.

Each patient had a confirmed diagnosis of keloid disease and was undergoing treatment or observation for at least one of their scars.

Demographic data was collected from each patient and is summarised in [Table 1](#). Each patient was then asked the same set of questions about each individual scar. Each patient was asked whether they had any scars which had previously resolved. This was useful in identifying old keloids that may have resolved without treatment. Data was collected and entered into a database created using Apple Numbers (Apple Inc, Cupertino, California, USA).

Resolution of a scar was defined, by the patient, as no longer placing a burden on the patient as defined by satisfactory appearance, satisfactory reduction in symptoms and no longer requiring treatment. Scars which had previously resolved and subsequently recurred were not defined as resolved.

Resolving scars were defined by the patient as improving with treatment either in appearance or severity of symptoms.

Active scars were defined by the patient as continuing to grow, continuing symptoms or not improving with treatment.

Statistical analysis was performed using SPSS version 16 (IBM, Armonk, New York, USA). Significance was calculated using unpaired *t* tests. A *p* value of <0.05 was considered significant.

## Results

The demographic data of each patient/scar is summarised in [Table 1](#). Results of the questionnaire are summarised in [Table 2](#).

Resolution of the scars, as judged by the patients, was reported in 46 scars (36.5%) with similar rates of resolution in Manchester (37%) and Bridgetown (35%). In each case of reported resolution the scar remained visible as an area of altered texture and pigmentation. However the patient felt the scar had resolved sufficiently so that it was no longer a burden on their lives. They reported that each resolved scar had a satisfactory appearance, was no longer symptomatic and no longer required treatment. Sixteen patients (47%) reported that at least one of their scars had resolved, six (18%) reported that all of their keloid scars had resolved and twelve (35%) reported that they had no scars which had resolved.

Thirty-six scars (29%) resolved with treatment, of which eight required more than one treatment. Therefore 36 out

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