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# Dora Colebrook and the evaluation of light therapy

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At the end of the 19th century, Niels Finsen – a Dane – had shown convincing evidence that tuberculous infection of the skin (lupus vulgaris) could be treated successfully with intensive light therapy,<sup>1</sup> and he received the Nobel Prize for this work in 1903.<sup>2</sup> Experiments using artificially-produced ultraviolet or visible light for treatment continued in the early 20th century, and they led to growing enthusiasm for light therapy of a variety of disorders, albeit predominantly skin conditions.

By the mid 1920s, light therapy was enjoying a boom in popularity. The public 'began to demand the treatment for every ill under the sun',<sup>3</sup> and medical practitioners, including the most eminent and influential of the day, adopted it widely. King George V received light treatment for his near-fatal pneumonia in 1928. The conditions said to benefit from it would 'begin with acne and go through to zona [shingles], including housemaid's knee and minor psychosis'.<sup>4</sup> Furthermore, the supply of lamps to physicians, unqualified light-therapy practitioners, and the public, was a lucrative enterprise. Enthusiasm ran high, and opposition to light therapy, particularly among the medical establishment, was almost non-existent. Unsurprisingly, therefore, meticulous research done by Dora Colebrook in the late 1920s, which was unable to detect any beneficial effects of light therapy, was a slap in the face to its proponents.

Dora Colebrook (1884–1965) had come rather late to medicine, qualifying MB at the Royal Free Hospital in 1915 and MD at London University in 1919. After spells as a gynaecologist at the Jessop Hospital in Sheffield and in general practice in Cambridge, she moved to London, where she worked at the North Islington Infant Welfare Centre, enthusiastically employing light therapy to promote 'an almost monotonous record of increased liveliness, brightness and vigour' among

her charges.<sup>5</sup> It was at that point, however, that she decided on a career in medical research.

## Medical Research Council studies of light therapy

Colebrook owed her introduction to the Medical Research Council (MRC) to her brother, the respected bacteriologist Leonard Colebrook. The MRC, which was afraid of being overtaken by the rapid expansion in light therapy before the Council could adjudicate on its effectiveness, established a Clinical and Biological Subcommittee to the Committee on the Biological Actions of Light and appointed Colebrook to act as its secretary.

Colebrook chose to study two areas where light therapy was almost universally believed to be beneficial: the treatment of varicose ulcers, and of 'weedy' or 'sickly' children. In 1927 she treated 84 patients with varicose ulcers, comparing conventional treatment with paste and dressings against light therapy. Eleven large ulcers were partially treated, half the ulcer being exposed to light while the other half was shielded as a control, a method of testing that had been used to assess treatments for burns five centuries previously.<sup>6</sup> Colebrook was unable to detect any beneficial effects of light therapy on varicose ulcers; indeed, paste dressings fared rather better than treatment with light.<sup>7</sup>

Colebrook conducted her schoolchildren study in a Willesden Council infant school, allocating 287 children into one of three groups – to receive no therapy, light therapy from an arc device, or therapy from an arc device shielded by glass to exclude the ultraviolet component (there was considerable debate, at the time, as to the relative therapeutic merits of visible and ultraviolet light). She gave no details of her allocation method, other than to state that it had involved

'drawing lots';<sup>8</sup> but in a letter sent to an official at the MRC in 1926 she had written 'I realise that in view of all the health factors ... which would be quite uncontrollable, only large numbers selected at random would give an impression of any value'.<sup>9</sup> Although Colebrook sought consent from parents for the involvement of their children in the study, she did not inform them that two types of light therapy were going to be compared. Her study was single blind (she and her co-investigators were aware of which children received which type of light), and if parents had refused consent for their children to participate, their children were included in the control group. Colebrook acknowledged that there were thus some differences between the treated and untreated groups. Treated children, for example, were more likely to have been given a bath the previous night, before stripping for light therapy! Once again, she was unable to show any beneficial effects of light therapy: no improvement was demonstrated in height, weight, incidence and duration of colds and other minor infections, school absence, school progress or overall wellbeing.

## Reactions

The ulcer study, first published in the *Lancet* in May 1928,<sup>7</sup> attracted little response. The two studies were then published together by the MRC, initially as a brief summary in the MRC annual report in March 1929,<sup>10</sup> then as an MRC special report the following September.<sup>8</sup> The negative findings flew in the face of medical orthodoxy, established opinion, and the commercial interests of light equipment manufacturers and of the private practitioners who used the equipment. Opposition to Colebrook's findings was rapid, widespread, and frequently vitriolic. Many objected that Colebrook's 'scientific' method was no match for the accumulated experience and wisdom of eminent physicians. A *BMJ* editorial<sup>11</sup> preferred the insights of 'a large body of experienced clinicians' and a *Lancet* editorial<sup>12</sup> opined similarly that so widely established a therapy must have therapeutic benefit, and that 'in the long run, neither medical men nor the public can be deceived.' Many practitioners wrote to express similar sentiments in these and other journals. The newspapers also became involved, the *Times*<sup>13</sup> and *Guardian*<sup>14</sup> carrying critical editorials and letters,

and the *Telegraph*<sup>15</sup> devoting an entire edition to the theme, with an editorial concluding that the long and distinguished pedigree of light therapy proved its value.

Dora Colebrook herself was frequently singled out for personal attack – whether as a rhetorical strategy, or because she was a woman, is unclear. Walter Fletcher, the MRC Secretary, expressed dismay at the criticism of Colebrook '... by name, and in isolation'.<sup>16</sup> Some critics emphasized her gender – the *Daily Telegraph* attributed the report simply to a 'woman writer' – and others suggested that she was acting alone, without any support or advice from the MRC or its light subcommittees.<sup>16</sup> This was far from the case, and Leonard Hill (father of Austin Bradford Hill), who drafted the introduction to the fuller, September, report, was at pains to associate the MRC with the report and its findings.

The debate represented a clash between epistemologies. There was no consensus on how best to assess the effectiveness of a drug or other treatment. Traditionalists favoured personal experience, claiming that the vagaries of individual responses to illness and to treatment rendered large-scale trials meaningless. They argued that only through clinical knowledge, experience and acumen, could a wise clinician assess therapeutic efficacy on a case-by-case basis.<sup>17</sup> Other practitioners favoured extrapolation from the results of laboratory studies exploring treatment mechanisms.<sup>18</sup>

## Colebrook's later studies of light therapy

Colebrook's schoolchildren study fulfilled all the basic requirements for what would subsequently be termed a randomized controlled trial (RCT), championed by the MRC from the late 1940s. She recruited a large number of participants, apparently allocated them at random into treatment and control groups, made an attempt to blind the participants to the nature of their treatment, and employed pre-determined, largely objective outcome criteria. Her methods cut no ice with traditionalists, however, who insisted that light therapy worked because they had seen its effects with their own eyes.

Light therapy slowly dwindled in popularity during the 1930s and 1940s. In 1946, Colebrook extended her light therapy research to study its

effects among office and factory workers, and coal-miners.<sup>19</sup> The Preface to her report, authored by the MRC's Industrial Health Research Board, stated that:

*In each of these three communities, appropriate numbers of the volunteers were allocated at random to a group which was to receive the full range of ultra-violet rays from quartz-mercury arc lamps ... As a standard of comparison, others of the volunteers were allocated, similarly at random, to a group which was to receive irradiation from lamps identical with those used for the first group, but which had been carefully fitted with glass screens which effectively prevented the passage of the shorter ultra-violet rays. This group could, therefore, reap no benefit from those particular rays to which the claimed effects had been attributed, though it shared with the first group any possible psychological advantage in having 'light treatment' and in paying the visits to the clinic.<sup>19</sup>*

Once again, Colebrook was unable to detect any benefits of light therapy. This time, medical responses to the results of her research were far less critical, although light therapy equipment manufacturers were vocal in their opposition. By the 1950s, the equipment manufacturers were fighting a rearguard action to preserve their claims for therapeutic efficacy against increasingly sceptical medical and public opinion. Today, light therapy is reserved for a small number of dermatological conditions in specialist centres.

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