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DECLARATIONS	Niels Ryberg Finsen was born 1860 in Thorshavn, Faroe Islands, and died in 1904. He was awarded the Nobel Prize in 1903 'in recognition of his contribution to the treatment of diseases, especially lupus vulgaris, with concentrated light radiation, whereby he has opened a new avenue for medical science'.
Competing interests	None declared
Funding	None
Ethical approval	Finsen developed Pick's disease while in his 20s, and he described in 1903 how the disease had influenced his scientific development:
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Contributorship	PCG is the sole contributor
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The disease was responsible for my starting investigations on light: I suffered from anaemia and tiredness, and since I lived in a house facing the north, I began to believe that I might be helped if I received more sun. I therefore spent as much time as possible in its rays. As an enthusiastic medical man I was of course interested to know what benefit the sun really gave. I considered it from the physiological point of view but got no answer. I drew the conclusion that I was right and the physiology wrong.... My intention was even then (about 15 years ago) to use the beneficial effects of the sun in the form of sun bathing or artificial light baths; but I understood that it would be inappropriate to bring it into practical use if the theory was not built upon scientific investigations and definite facts.... During the last few years, I have, however, become convinced that it does not help to wait until I find the answer I am looking for in the laboratory, but that it is justified to work also with clinical experiments. Thus both approaches can be carried out simultaneously in the effort to reach the final goal.¹

Finsen communicated his preliminary results of the use of 'the chemical rays of light' in 1896.² The term 'chemical light' referred to light with chemical effects, also called ionizing light, such as ultraviolet rays. It was already known at the time that such light could have a bactericidal effect. In

addition, lay people, alternative practitioners, and possibly one doctor had reported a positive effect of concentrated sunlight on cutaneous tuberculosis (lupus vulgaris). Two patients had also been treated by electric light.

Finsen criticized these reports, suggesting that the light exposure was far too brief to have had any effect, and because the methods used depended on the burning effect of light, which caused substantial adverse effects. He experimented with different light fractions and discovered that the effect was related to the short-wave spectrum.

Finsen used a standard bacterium, *M. prodigiosus*, for most of his experiments, but also experimented with typhoid and anthrax. He found out how far light rays penetrated into tissues, showed that the bactericidal effect was related to the concentration of the light, and discovered that blood hindered penetration. He developed equipment that concentrated light 15 times and could be used to treat affected areas of about 2 cm in diameter at a time, and he developed devices to apply pressure to prevent blood from entering the areas being treated.

His 1896 report contains details on 11 patients, who had had lupus vulgaris for between five and 21 years, and whom he had treated for two hours daily for several weeks on the same spot. He acknowledged that 11 cases was not a large sample, but noted that as the treatment was local, the effect in one and the same patient could be noted 10 times or more.

Finsen established a centre for administering his treatment.³ He noted that patients with lupus vulgaris were socially very isolated and had difficulty finding work because of their appearance, particularly because the disease usually affected the face. Since most of his patients were poor, his centre was supported by sponsors and by the

Table 1
The results of patients who were treated at Finsen's centre

Results	n
<i>I. Cured</i>	412
(a) No recurrence during 2–6 years	124
(b) Observation time less than 2 years	288
<i>II. Nearly cured (insignificant residual disease)</i>	192
<i>III. Currently being treated</i>	117
(a) Significantly improved/partially cured	91
(b) Poor/temporary improvement	26
<i>IV. Interrupted treatment (unfulfilled cure)</i>	83
(a) Unsatisfactory result	16
(b) Dead (31), suffering from other serious diseases (13)	44
(c) Absent for reasons irrelevant to the disease	23
<i>Total</i>	804

municipality of Copenhagen, and a charity was established for the patients.

Six years later, at a meeting in Berlin for the members of the International Central Bureau for Eradication of Tuberculosis, Finsen presented the results of treating 804 patients.⁴

He noted that, apart from a few patients whose condition he judged to be hopeless, his report covered all the patients who had come to his centre. His results are shown in Table 1.

He excluded 67 cases in groups IVb and IVc and noted that 695 (94%) of the remaining 737 cases were responding favourably to treatment. He also

noted that results as good as his might not be achieved elsewhere because equipment and lamps inferior to those used in his institute had recently been introduced into the market.

In another publication the same year,⁵ Finsen observed that some people may have seen some of his investigations as superfluous, since the facts about light treatment for lupus vulgaris were already known. He argued that he had had to do his own studies because he was unable to confirm some previously reported results. By using ultraviolet rays, he avoided burning and scarring the skin without losing the bactericidal effect of the treatments, and he constructed crystal rather than glass lenses.

The following year, upon receiving the Nobel Prize for his work, Finsen said that 'The supreme qualities of all science are honesty, reliability, and sober, healthy criticism'.

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