

Danlos for being the first to use radium clinically, but as in the case of Francis Williams, the results were not effective. He also was probably the first to whom it occurred to actually use radium for therapy, preceding Ernest Besnier. Strebel's report²⁵ in 1903 in the *Deutsche Medizinische Zeitung* stated that he "placed a quantity of radium enclosed in a capsule made from cardboard and paraffined paper on an area of lupus and left it in place for hours. A moderate reaction was obtained with subsequent fading of the lupus node. With further irradiation an ulcer formed which healed only poorly, but the lupus was not healed." Strebel reasoned that the unsatisfactory results were attributable to "low radiation capacity of the radium available." He then noted that Danlos and Bloch had announced their successful treatment of lupus vulgaris *after* his own unsuccessful attempts.

4.4 Russia

Non-malignant skin conditions such as lupus and angioma were chosen for treatment before skin cancers. Then, in 1903 in St. Petersburg, reporting²⁶ in the *Dermatologische Zeitschrift*, S.W. Goldberg and Efim Semenovich London claimed the first histologically proven cure of a basal cell carcinoma of the face. However, unlike the first documented^{27,28} histologic cures from X-rays (also for basal cell carcinomas of the face, in 1899 in Stockholm), no photographs of the radium patient before and after treatment are known.

5. PRIORITY FOR RADIUM AFTERLOADING

In 1903, Hermann Strebel of Munich was the first person to propose²⁵ the use of afterloading, although Robert Abbé of New York who published in 1906¹⁵ is often given priority for this important radium brachytherapy technology proposal.

In his report, Strebel comments that the radium sources available to him in 1903 had a strength of 1.5 million uranium units and were capable of producing radiation dermatitis lasting 8–14 days after an exposure of only 10 minutes. It was to avoid this problem that he instituted his interstitial afterloading technique:

I am now in a position to increase the effectiveness of radium for deeper seated pathological conditions quite significantly, without causing undesirable effects on the skin itself. Instead of surface applications, intratumoural application is carried out by inserting the radium, which is enclosed in the drilled tip of a small aluminium rod, directly into the centre of the tumour, with the help of a previously inserted trepan. This increases the size of the irradiation beam in that the radium irradiates evenly in all directions.²⁵

Strebel then continued to advocate the trepan (afterloading guide) needle being inserted in various directions, always using the first insertion opening, and he stated that this method is suitable for cancers of the uterus, stomach, and liver, and "can be used successfully as a substitute for X-rays when it is a question of the treatment taking place within small spaces such as the nose, larynx, and bladder."

The idea of insertion of the radium within the trepan needle in various directions is essentially the idea of crossfire irradiation, although Strebel did not use that term. It was left to Louis Wickham and Paul Degrais in 1910²¹ to clearly define crossfire. In 1913, they further described an interstitial technique for the treatment of an inoperable malignant tumour of the neck in which they used goose quills as afterloading guides (Figure 2)²⁹. They reported that the quills "allowed introduction of radium tubes deep into tissues at four opposite points of the tumour."

6. REFERENCES

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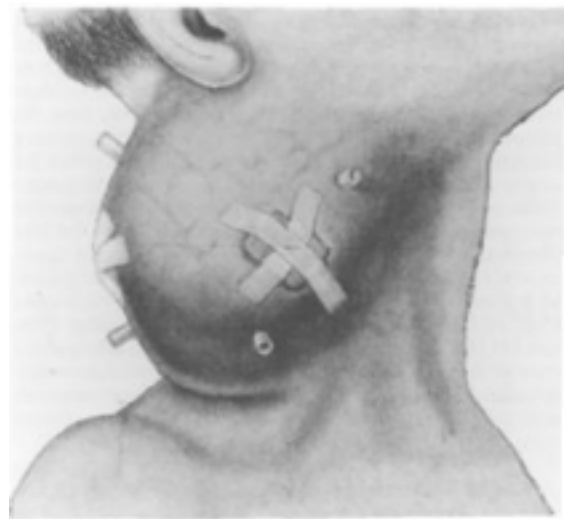


FIGURE 2 An interstitial technique using crossfire for the treatment of an inoperable malignant tumour in the neck²⁹.