

## LOW DOSAGE X-RAY RADIATION OF PITUITARY AND OVARIES FOR SECONDARY AMENORRHOEA AND STERILITY

BY

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This therapy for these conditions has not been practised widely in India. I, therefore, make no apology for placing before you the results of my cases, even though the number of cases treated is quite small. It is more with a view to introduce the subject and compare the results with those of others who might have adopted this therapy in their practice.

In 1915, Van De Veldi employed x-rays for stimulating uterine function.

In 1922, Hafbauer treated uterine bleeding by irradiation of pituitary gland. His opinion was that even massive doses of x-ray radiation did not alter the pituitary cytologically.

In 1926, Wagner & Schoenhof also did not notice any ill effects of x-ray radiation, either on ovaries or pituitary.

The results of 21 cases treated by them for secondary amenorrhoea showed that 76% of them improved; 24% had no relief but had no bad after-effects either. 3 cases, of which 1 was extra-uterine and 2 intra-uterine, conceived. In 1931 Frank gave a warning against x-ray radiation as it was likely to cause

permanent amenorrhoea. In 1935 Mazer & Splitz treated 11 cases, and in 1943 Mazer & Greenberg treated 28 cases by x-ray radiation of ovaries and found no ill effects on the ovaries. In 1944, Croke gave 1600 r dose direct to the brain and expressed an opinion that it was a good adjunct to treat menstrual irregularity. Wolff advised small doses of high voltage and developed his own technique. He believed that radiation was most successful in treatment of amenorrhoea and sterility.

In 1946, S. G. Winson presented an analysis of 257 cases of sterility. Of the 49 cases treated for amenorrhoea, 29 or 59.1% had regular menstruation. In his opinion, low dosage irradiation of the pituitary and ovary was the most effective form of therapy. Of 32 cases so treated, 28 or 87.5% conceived. Therapeutic adjuncts included small doses of thyroid, regardless of basal metabolic rate, correction of faulty diet, insulin for underweight and removal of foci of infection.

In 1947, Randall submitted results of treatment of 87 cases of amenorrhoea in young women, carried out at Mayo Clinic. He remarked that x-ray radiation in small doses to the pituitary or ovaries or both had been used safely and effectively

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at Mayo Clinic for eighteen years. Such treatment was often successful in re-establishing the menses, but the effect was frequently only temporary, and treatment had to be repeated. It was more successful in cases where amenorrhoea was due to pituitary failure.

In the same year, J. O. Haman reported his results of cases of sterility and amenorrhoea treated by low dosage of x-ray radiation of pituitary and ovaries. He adopted Edieken's technique. 71% of 32 cases of amenorrhoea were successfully treated and normal menstruation was established in them. The percentage of cures was inversely proportionate to the length of amenorrhoea. Pregnancy followed in 12 women out of 18, who complained of sterility and amenorrhoea. All off-springs were normal. The author contended that objections to this therapy, viz. production of permanent amenorrhoea and production of abnormalities in children in second and third generations, were not disclosed during search of the literature. He thought those objections were speculative. In his opinion, x-ray radiation appeared to be the most effective and economical treatment of secondary amenorrhoea with its accompanying sterility.

Dr. Gerald W. Gustafson reported 24 cases of sterility and amenorrhoea treated by this therapy by *Dr. J. I. Campbell*. In 17 cases normal menstruation was established and 4 conceived.

In 1949, Playfair & Booth treated 21 cases of secondary amenorrhoea by low dosage radiation. They adopted the Kalpan technique deve-

loped in 1940, viz. 200 K. V., 15 M.A., 1.5mm. copper and 1.0 mm. aluminium as filters, focal skin distance 50 cm., ovaries treated by right and left anterior and posterior exposures, each field being 15 x 15 cm. Pituitary was treated through central field on forehead aimed at Sella Tursica 6x8 cm.

Spacing of dose was as under:—  
1st day 75 r to the right and left ovarian fields anteriorly; and 75 r to the pituitary.  
7th day 75 r to the right and left ovarian fields posteriorly.  
14th day 75 r same as on 1st day.

*Criteria of Success.* Certain criteria were laid to judge the results. The treatment was considered successful, if menstrual period started within 21 to 40 days after the treatment, and subsequently established regularity with a blood loss for 3 to 4 days. The case was considered improved, if menstruation started 40 days after the treatment, but regularity was not established. Failure was indicated if periods did not start or they appeared irregularly.

The results in 21 cases treated, based on these criteria, were as under:—

Successful	14 cases	66.6%
Improved	2 cases	9.5%
Failed	5 cases	23.9%

Cases were selected by eliminating any disease of thyroid, pituitary or genitalia. Pregnancy was excluded by a biological test. It was noticed that success was more likely in cases who had secondary amenorrhoea of less than 30 months' duration and uterus of about 1.5" size.

I now present to you the analysis of 27 cases treated by us by low dosage x-ray radiation for secondary amenorrhoea with sterility, and in sterility with regular menstruation during the period between March 1946 to July 1949.

In 1946	3 cases.
In 1947	3 cases.
In 1948	16 cases.
In 1949	5 cases.

Questionnaire was issued to collect the latest information from the patients. Of 27 patients, 19 were treated for secondary amenorrhoea and sterility, 7 for sterility with regular menstruation, and 1 an unmarried girl for irregular menstruation with profuse bleeding. Of the 19 cases of secondary amenorrhoea, information was not received in three cases. Of 7 cases of sterility, 5 did not reply.

The technique adopted by Dr. M. D. Joshi, radiologist, was almost the same as that of Edieken, viz. 135 K.V., 4 M.A., 40 cm. distance, time 5 minutes, filter 0.5 mm. copper and 1 mm. aluminium. 15 cm. x 10 cm. Field, and rays were directed on the anterior pelvic area. 60 to 90 r measured in air dose was given to the skin according to the thickness of the patient. Three sittings were given with intervals of seven days between each sitting. The pituitary gland was also treated with the same factors, but the field was small and just sufficient to cover the pituitary gland. The dosage to pituitary was 50 to 60 r measured in air.

By this technique, except in one case who complained of giddiness, nausea and weakness for a few

hours, no untoward symptoms developed.

Of the 16 cases treated for secondary amenorrhoea from whom information was received,

9 or 56.25% established normal menstruation, judged on the standard laid down by Playfair & Booth and already quoted in this.

2 or 12.5% improved.

5 or 31.25% failed.

6 or 54.5% of the 11 successful cases of secondary amenorrhoea conceived. All were intra-uterine pregnancy. Some have delivered and their infants are normal and healthy. Period of amenorrhoea varied from 2 months to one year. Results were successful in cases with amenorrhoea of less than 9 months. Ages of the successful cases varied from 16 years to 24 years.

TABLE

Age	Successful cases	Failed cases
16	1	nil
17	1	nil
18	1	2
19	4	nil
20	1	nil
22	2	2
24	1	nil
25	nil	1
	11	5

7 cases were treated for sterility. Their menstruation was regular. Only two of them replied. Of these only one conceived. 5 did not reply and we therefore put them down as failures. Their ages varied from 23

years to 29 years. The one that conceived was 29 years old.

One case was that of a 15 year old girl, unmarried with irregular but very profuse menstrual periods, thin and small in stature. She was treated with various hormone preparations, insulin, etc. but with no result. X-ray radiation improved her, and her periods are now regular.

#### Summary.

16 patients were treated for secondary amenorrhoea and sterility. All of them had underdeveloped uterus. No other complication or disease was present. Almost all of them were treated for shorter or longer period by endocrine therapy with no improvement. All were married women. Some of them had dilatation and curettage performed by some gynaecologists. Of these

9 or 56.25% had regular menstruation established;

2 or 12.5% improved considerably;

5 or 31.25% failed.

Conception occurred in 6 or 54.5%.

7 patients who had regular periods were treated for sterility. Of these only one conceived. Though they had regular periods, except in two cases, their uterus was found to be under-developed.

1 case of a young unmarried girl had irregular periods but had profuse bleeding every time. Her periods by this treatment became regular with satisfactory blood flow. She has considerably improved in her general health.

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