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### Endometrial Scratch Therapy

Despite technological advancements in the field of IVF, the success rate of IVF is about 50-55%. Implantation is the rate limiting step in all artificial reproductive techniques. Implantation is a complex and multifactorial process which involves various molecules which regulate the synchrony and interaction of the embryo and endometrium. Implantation involves 2 major parts- a good quality embryo that should have the potential to implant and a endometrium that is receptive to the embryo. This dialogue between the embryo and endometrium leads to apposition, attachment and invasion of embryo which is essential for successful implantation and eventually normal placentation. Any abnormality or asynchrony of the endometrium of embryo will result in implantation failure [1].

There have been various methods which have been attempted to improve embryo and endometrial synchrony. Endometrial scratch therapy has been recommended to improve the implantation rate in women undergoing ART cycles. Mechanical manipulation of the endometrium has said to improve the endometrial receptivity by modulating the gene expression of factors such as laminin alpha 4, integrin alpha 6, matrix metalloproteinase 1 and glycodefin A which are essential for implantation [2]. The mechanism that has been proposed to improve endometrial receptivity and implantation is that of endometrial regeneration, which could slow down the disproportionate development of endometrium which is associated with ovarian stimulation cycle and therefore ensure embryo-endometrial synchrony. Another mechanism which played a role during endometrial scratches is increased production of growth factors and pro-inflammatory cytokines locally [3].

#### Procedure

Endometrial scratch therapy is a simple, minimally invasive and inexpensive office procedure that can be used to improve clinical pregnancy and live birth rates in women undergoing ART. It can be done along with hysteroscopy as well.

The procedure is done usually in the luteal phase of the previous cycle. Sometimes it may be done in the early follicular phase in which the embryo transfer is planned when it isn't possible in the previous cycle.

Using a simple catheter such as the pipelle catheter or endometrial aspiration cannula, endometrial scratching can be done without anaesthesia. The patient is placed in lithotomy position and under aseptic precautions, the catheter is inserted into the endometrial cavity. The endometrium is scratched by back and forth movements. The procedure time is less than 2 minutes and is painless. Endometrial scratching may be associated with complications such as bleeding or infection but they are very rare.



## Procedure

The concept behind endometrial scratching has been laid down since the early 20th century, when Loeb et al. showed that in mechanical irritation of endometrium at 2-9 days after ovulation led to decidualisation [4]. Endometrial scratching has been in use since 2003 especially in women with recurrent implantation failure. Barash et al. were the first to test the hypothesis that injury in the natural cycle prior to COH could increase the chance of pregnancy. They concluded that there was a 2-fold increase in live birth rate after endometrial scratching [5]. In 2012, a meta-analysis by Potdar N et al. was published which included 7 controlled studies including 2062 participants with recurrent implantation failure. They concluded that endometrial scratching is 70% more likely to result in clinical pregnancy as opposed to no treatment [6]. Another study, published in 2013 by Gibreel A et al, examined the effect of endometrial scratching in women with unexplained infertility. 105 women were included in the study. It was seen that the clinical pregnancy rate was significantly higher in the study group (25.9% vs 9.8%) as compared to the control group [7]. In 2016, Şeval MM et al. conducted a study to see the effects of endometrial scratching during diagnostic hysteroscopy in patients with recurrent implantation failure. It was observed that the implantation rate was much higher in patients who underwent endometrial scratching during hysteroscopy [8]. Recently in 2017, Kriplani A et al published a study to see the effects of endometrial scratching on patients undergoing intra-uterine insemination (IUI). The results of the study showed that patients in the study group had a higher clinical pregnancy and on going pregnancy rate as compared to the control group. Furthermore, on per cycle analysis it was seen that first IUI cycle had a higher clinical pregnancy rate with patients in the study group.

## Conclusion

Endometrial scratching is a low-cost, painless, OPD procedure which is beneficial in improving implantation rates especially in patients with recurrent implantation failure. It can be performed during the luteal phase of the previous cycle or it may be done in the earlier follicular phase of the cycle in which the transfer is planned. However there is a need for more evidence on the ideal time, method, mode and number of scratches required to improve implantation rates.

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