

# A COMPARATIVE STUDY OF EFFECTIVENESS OF COLD COMPRESSION THERAPY VERSUS INFRARED RADIATION THERAPY ON HEALING OF EPISIOTOMY SURGICAL WOUND

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## **ABSTRACT**

**Background:** During the course of delivery many women undergo episiotomy. Episiotomy is painful and takes a couple of weeks to heal fully. Though various antibiotics and analgesics are routinely prescribed after delivery for enhancing the wound healing and decreasing the pain, but most of the local therapies for healing for the episiotomy wound are often less utilized. Sitz bath, Cold compression therapy with application of cold gel pad and wound radiation by infrared therapy are often used to reduce pain and enhance wound healing. The study was done with the primary aim to compare the effectiveness of cold compression therapy versus infrared therapy on healing of episiotomy wound among postnatal patients.

**Methodology:** A comparative interventional study was conducted for a period of 6 months during which 100 vaginally delivered patients were included in the study. The patients were included after obtaining written and informed consent and fulfilling the inclusion criteria. The patients were randomly divided using closed envelope method into two equal groups; viz, group A, who were given cold compression therapy by cold gel pack and group B, who were given infrared therapy. In the two groups local wound therapies were given two times a day (morning and evening), for three consecutive days after delivery. At the end of 3 days after the therapies, the REEDA scale scoring was used to assess healing of episiotomy wound. Data entry was done in Microsoft Excel and analysis carried out using SPSS (Statistical Package for Social Sciences) Software version 20/ Epi Info.

**Result:** Demographically both the groups were equal in terms of age, parity etc.; and statistically not significant. More than half of the patients were Primigravida. Based on REEDA scores, both the groups were compared and it was found that, local wound therapy

with infrared radiation was statistically better than cold compression therapy, in healing of episiotomy wound. (p-value<0.001)

**Conclusion:** Use of infrared light therapy was found to be a better method than cold compression therapy in terms of healing of episiotomy wound.

**Keywords:** Episiotomy, Healing, REEDA score, Cold compression therapy, Infrared therapy.

## Introduction

A vital phase in maternal health care is the postnatal period which can be associated with complications that can be life intimidating and threatening. As a result of labour, childbirth and episiotomy wound, in particular, the mother suffers perineal pain and distress during the immediate and early puerperium and it might turn out to be quite demanding and challenging period.<sup>1</sup>

Pain is a universal complaint following delivery. During the puerperium there is a high risk of improper wound healing and the main aim of the health care provider is to help in quick healing of the wound and reduce/relieve pain.<sup>2</sup> Most of the episiotomies take at least 2 weeks to heal well and about 4 to 6 months to heal completely<sup>3</sup>. Various therapies and interventions exist for enhancing the healing of episiotomy wound and relieve pain. Some of them are Sitz bath, Dry Heat, Cold Compression (fomentation), Hot Fomentation, Infrared Radiation, Perineal Exercises etc.

Though various analgesics and medications are prescribed to the patient after vaginal birth with episiotomies, the overall use of local therapies for healing of episiotomy wound are limited and used very infrequently. Moreover, there is paucity of good quality data from studies conducted by qualified medical practitioners, on these local therapies. These therapies are mostly given by patients themselves or by their attendants with no formal medical education and training on these therapies.

By reducing the perineal pain and enhancing healing, the postnatal mothers can ambulate early, can take better care of themselves and their newborn, also milk letdown reflex can be better. Hence, we felt the need to compare the effect of two therapies (cold compression and infrared radiation) for healing of episiotomy wound.

Cold compression therapy consists of local application of the cold gel pad obtained from the deep freezer of a refrigerator. Few advantages of cold compression therapy are;

1. It usually acts by paresthesia of peripheral nerve fibers and reducing inflammatory response and muscle spasm<sup>8</sup>
2. It causes vasoconstriction, followed by decreases blood circulation resulting in reduced pain.<sup>9</sup>
3. Better blood flow after initial vasoconstriction of small vessels, leading to increased oxygen and nutrients supply and removal of waste products from the local episiotomy wound.<sup>8</sup>

Infrared heat is a type of superficial heat which has electromagnetic energy modality and increases the temperature superficially.<sup>4</sup> The advantages of infrared radiation are,

1. It increases the local blood flow and hence the oxygen and nutrient supply to the healing wound, accelerates the removal of waste products and metabolites which helps in reducing the inflammation.<sup>5</sup>
2. It also aids to accomplish muscular relaxation and for the release of muscle spasm associated with injury or inflammation.
3. It prevents the growth of microorganisms, helps in healing damaged tissues, helps in approximation of tissues, relieves pain, provides soothing and helps in fast wound healing.<sup>6,7</sup>

This study was undertaken to evaluate the effectiveness of cold compression therapy versus infrared radiation therapy for healing of episiotomy wound.

## Materials and Methods

The study was conducted among patients delivering in labour room of Department of Obstetrics and Gynecology of Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, India. A comparative interventional study was conducted from September 2021 to February 2022. Institutional ethical sub-committee clearance was obtained before the initiation of the study (I.E.S.C./53/2021). All postnatal mothers (patients) who delivered by vaginal route with episiotomy and who were willing to participate in the study were included.

### Inclusion Criteria

1. Age >19 years
2. Right mediolateral or left mediolateral episiotomy.
3. The first 3 days of postnatal period

### Exclusion Criteria

1. Severe anemia
2. Postnatal mothers with defective sensation in perineal region
3. Psychiatric illness
4. Unconscious / Critically ill postnatal mothers
5. Instrumental vaginal deliveries
6. Postnatal mothers with heart disease, medical and surgical disorders
7. Prolonged 2nd stage of labour.

Patients who fulfilled the inclusion criteria and gave written informed consent, were included in the study. A total of 100 subjects were included. They were divided equally into two groups by closed envelope method viz. Group A who were given cold compression therapy with cold gel pad and Group B who were given infrared light therapy. The included patient themselves picked up a prior sealed envelope which were kept in a tray. Thus all the included patients were unaware of their group allocation status at the beginning.

Pre-designed questionnaire in local language and national language (as per patient's choice) were framed and scoring by standard REEDA scale charting was also included. History, examination, investigations, local therapy for healing of episiotomy wound and REEDA score was done by authors, on duty consultants and staff nurses at same center.

- Standard care of episiotomy includes Antibiotics, analgesics and local antiseptic solution was given to all the patients twice in a day.
- Cold compression therapy is defined as the application of cold gel pack on the episiotomy site for 15 minutes each, in the morning and evening, for 3 consecutive days after delivery, with the help of patient attendant initially and later by attendant or patient herself.
- Infrared light used in the study consumes 150 watts and runs on 250 voltage. The duration of exposure was 15 minutes each in the morning and evening, for 3 consecutive days after delivery. It was given by an patient attendant initially and later by attendant or patient herself. The treatment commenced with the infrared source placed at a distance of approximately 30cm from the surface of episiotomy.
- REEDA Scale was used to assess postpartum restoration of the perineum. It has five components namely: Redness, Edema, Ecchymosis, Discharge, Approximation (closeness of skin edges), with a score of 0 - 3 for each of the parameters to indicate increasing severity of wound complication.<sup>10</sup>
- It is a healing assessment tool based on a scale of three points for each component of REEDA scale. Score 3, for each component of REEDA Scale, is indicative of very poor wound healing. The final entire REEDA score ranges from 0 to 15 points. Higher final REEDA score indicates poor wound healing while lower score indicates good wound healing<sup>11</sup>. It was assessed on day 0 before giving any local therapy and reassessed on day 3 after giving cold compression therapy or infrared light for 3 days.

Scoring for REEDA scale was done by all consultants and duty doctors at assessment rounds, by decision of majority. The assessors were not aware of the given therapy; hence observer bias was removed.

➤ **REEDA score**

Score	Interpretation
0-2	Good
3- 5	Moderate
6- 8	Mild
9- 15	Poor

- The collected data was coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data was presented as percentage in categories and then presented as tables and diagrams. Chi-square test and t-test were used for test of statistics.

**Results**

**Table 1: Comparison of demographic data**

Variable	Group A	Group B	P Value
Age (Years)	23.88 ± 2.47	24.18 ± 2.65	>0.05
Gestational Age (Weeks)	38.64 ± 1.26	38.42 ± 1.35	>0.05
Parity	1.56 ± 0.72	1.64 ± 0.71	>0.05

The demographic data of these 2 groups were comparable in respect to age, gestational age and parity with p-value being >0.05. Both the groups are homogenous as P>0.05 hence comparable.

**Table 2: Distribution according to number of stiches**

No. of stiches	Cold compression group	Infrared group	Total	P value
4	10	7	17 (17%)	P>0.05
5	37	43	80 (80%)	
6	3	0	3 (3%)	
Total	50	50	100 (100)	

In Table 2, paired t-test shows that there is no significant difference between the number of stiches in the two groups as P>0.05.

**Table 3: Distribution according to REEDA score in the cold compression therapy (Group A) and in the infrared therapy (Group B)**

REEDA score	Before therapy		After 72 hours of therapy		Paired t test
	GROUP A	GROUP B	GROUP A	GROUP B	
0-2 [Good]	0	0	0	0	P <0.05
3-5 [Mild]	0	0	0	38	
6-8 [Moderate]	13	20	38	6	

9-15 [Poor]	37	30	12	6
Total	50	50	50	50

Table 3 shows that, REEDA score after 72hrs of either therapy was significantly improved in both the treatment groups as found by paired t test in each individual groups. REEDA score was significantly better in group B therapy as compared to group A, as P was <0.05 after t test in mild score category, whereas not so for group A category

**Table 4: Comparison between cold compression therapy and infrared therapy using REEDA score before and after therapy.**

REEDA score	Before therapy	After therapy	P value
Group A	10.70 ± 2.85	7.92 ± 2.09	P<0.006
Group B	9.88 ± 2.93	4.94 ± 2.02	P<0.001

On comparing the REEDA scores cold compression therapy and infrared therapy, both show significant better healing in respective patient groups, but difference was significant in group B therapy P<0.001 as compared to group A therapy P<0.006. Also as shown in table no.3, more patient went in mild score of REEDA for Group B as compared to Group A, which itself explains the result, that Infrared Light Therapy to group B is better than Cold Compression Therapy to Group A.

## Discussion

Demographically all patients were similar and REEDA score before both the therapy were similar, hence all the patients were comparable. Eighty percent of the patients had 5 episiotomy sutures which was similar to a study by Wilbert CJ<sup>14</sup>. As the number of sutures increase so does the time taken to heal and the morbidity.

In the present study a total of 67 patients (37 of the cold group and 30 of the infrared group) were in the poor zone of REEDA score before respective treatment. None were in good category according to REEDA score. This indicates all patients had similar REEDA score prior to therapy. A study by Nethravathi V, Kshirsagar N and Satish V was done on Effectiveness of Infrared Lamp Therapy on Healing of Episiotomy Wound among Post Natal Mothers and reported that according to the REEDA score, more than 90% of the patients were in the poor zone prior to treatment. None were in good category<sup>15</sup>.

Nethravathi V, Kshirsagar N and Satish V also reported that post treatment, a significant number of patients were in the good and mild zone of REEDA score, which was a similar finding to the present study<sup>15</sup>. Post-intervention comparison showed significantly better wound restoration in their study group (treated with infrared therapy) as compared to control group. This might be due to an increased blood supply because of infrared which leads to better oxygen and nutrient supply to the healing tissues. The pretreatment score of the both the groups were higher and close by in the present study which was also a finding by Nethravathi V, Kshirsagar N and Satish V<sup>15</sup>.

The studies by Nam HK, Park YS<sup>16</sup> and Maksin JK<sup>17</sup> also found infrared therapy indicated good and rapid improvement of wound healing which was similar to the present study finding. This means that the improvement in wound restoration in study group is because of the intervention done, as Infrared not only helps in fast wound healing, but also helps to prevent growth of microorganisms, absorption of moisture, helps in healing of damaged tissue.

Cold compression therapy causes vasoconstriction initially and the vasodilation is a reflex reaction which might be inferior when compared to that after infrared therapy. In cold compression therapy there should be close contact to the perineal skin by the ice gel pad which can lead to contamination of the wound surface, needs additional person to hold ice

pads for a duration of 15 mins, also needs energy source for storage in the refrigerator, it can cause some pressure in wound which itself may cause pain and the wound healing may be delayed or disturbed due to disruption of movements of the ice pack.

Vineetha B and Smitha S<sup>12</sup> study reported infrared light therapy was more effective in reducing pain of episiotomy and enhanced wound healing. Neethu Baby<sup>13</sup> and R. Geetha<sup>18</sup> also reported the same finding, There is negative correlation between pain score level and wound healing, which means pain reduction occurs as wound healing progress. It may be due to increased circulation and anti-inflammatory effect in this area after using of Infrared therapy.

### **Conclusion**

Infrared therapy is recommended over cold compression therapy because of better REEDA score which was found statistically significant. Additionally, we found that infrared therapy is available at low cost, safe to handle, easy to use, no technical expertise needed, user friendly, has no biomedical waste and no gross side effects.

### **Limitations**

1. Non blinding of the persons who provide the therapy to the patients.
2. Non blinding of the patients.
3. Sample size is limited due to limited time period
4. Perception of pain is a subjective phenomenon, so mild pain may be considered as moderate pain in few patients.
5. REEDA score is subjective assessment.

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Conflict of interest: Nil

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