

COMPARATIVE CLINICAL STUDY OF EFFICACY OF GREEN OIL & KUPPLAI PASTE  
IN THE MANAGEMENT OF CHRONIC WOUND (VRANA)

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**Abstract:** Wound healing is a complex and dynamic process with the wound environment changing with the changing health status of the individual. The knowledge of the physiology of the normal wound healing trajectory through the phases of haemostasis, inflammation, granulation and maturation provides a framework for an understanding of the basic principles of wound healing. Through this understanding the health care professional can develop the skills required to care for a wound and the body can be assisted in the complex task of tissue repair.

A chronic wound should prompt the health care professional to begin a search for unresolved underlying causes. Healing a chronic wound requires care that is patient centered, holistic, interdisciplinary, cost effective and evidence based.

Forty patients with chronic wound were enrolled in this comparative clinical study. For each group twenty patients were selected randomly, informed consent was attained and then they underwent treatment with either green oil or Kupplai paste for dressing daily for 8 weeks. The follow up duration was minimally 1 - 2 months.

In the study percentage of 57.5% male and 42.5% female patients in the sample Age group of 30 to 40 years 20%, 41 to 50 years 32.5% and 51 to 60 years 47.5% of patients were chronic wound with different wound size, pain and other criterias in the two groups. P values of group A ( $P = 0.005$ ) > P values of group B ( $P = 0.000$ ), therefore reduction of the wound size in the Group B (Kupplai paste) is more significant than Group A (Green oil).

Conclusion that the application of kupplai paste can be used more effective than green oil on healing of the wound management.

**Keywords:** Chronic wound, Green oil, Kupplai paste, reduction of wound

## 1. Introduction:

Chronic wounds affect 60 million people worldwide and cause a heavy burden on patients, families, and society. Although various treatments are available in western medicine, chronicity and delayed healing of wounds continue to impair lives. (Kane D 2001)

A wound may be described in many ways; by its etiology, anatomical location, by whether it is acute or chronic, by the method of closure, by its presenting symptoms or indeed by the appearance of the predominant tissue types in the wound bed. All definitions serve a critical purpose in the assessment and appropriate management of the wound through to symptom resolution or, if viable, healing. (Kane D 2001)

A wound by true definition is a breakdown in the protective function of the skin; the loss of continuity of epithelium, with or without loss of underlying connective tissue (muscle, bone, nerves) following injury to the skin

or underlying tissues or organs caused by surgery, a blow, a cut, chemicals, heat or cold, friction or shear force, pressure or as a result of disease, such as leg ulcers or carcinomas.

Wounds heal by [primary intention](#) or [secondary intention](#) depending upon whether the wound may be closed with sutures or left to repair, whereby damaged tissue is restored by the formation of connective tissue and re-growth of epithelium.

Wound healing is determined by the general health of the patient. The assessment of the patient as a whole is critical for the planning and evaluation of care and should include:

Medical history, Cause of tissue damage, Medication, allergies, other diseases such as: Diabetes, Vascular disease, Immune compromise, inadequate nutrition, Lifestyle or environment, Obesity, Tobacco or alcohol abuse, impaired mobility, inadequate social network, caregiver support, Psychological problem.

Chronic wounds are that do not heal, as compared to acute wounds, which follow a normal recovery path. All wounds originate in the acute stage of healing and derive from a variety of reasons including trauma, surgery, sickness, or bodily inadequacies, such as venous insufficiency. In general, any trauma that leads to tissue damage can result in a chronic wound. Chronic wounds arise from conditions including diabetes, venous hypertension, alterations in health status, and immune function suppression. (Kane D 2001)

Acute wounds become chronic wounds when biological and environmental factors combine to create a wound environment that fails to support a natural and timely healing process.

Many experts consider a wound chronic when it no longer follows the expected course of events or falls within the range of what is considered a normal healing process.

Chronic wounds fail to respond to treatments, possess an unhealthy tissue quality, and fail to achieve proper closure, which leaves the wound susceptible to infection.

According to the Ayurvedha Sustrutha Samhitha mentioned, that depending up on *dosas*. *Vrana* (wound or ulcer) is of two kinds. such as *sarira* (bodily or endogenous) *agandu* (external/ exogenous) among these *sariravrana* is caused by aggravation of *vata*, *pitta*, *kapha*, *rakta* and *sannipatha*. *Agantuvrana* is caused by external factors, such as injury, falling from height, animal, poison, weapons, etc.

Depending up on aggravation of *dosas*, *sarira* wounds are of 16 kinds, such as *vata*, *pitta*, *kapha*, *rakta* separately and combination of two *dosas*, such as *vata-pitta*, *vata-kapha* like wise.

It symptoms & signs are two kinds general, special. General symptom is pain, special symptoms are produced by aggravated *dosas*. It's method of treatment are 60.

### Justification:

Effective Siddha medicine has been used for thousands of years for the management of various chronic wounds. However, due to lack of availability and lack of research evidence, Siddha medicine treatments are not widely accepted in the world wide. These two drugs are using siddha physicians for chronic wound. Still not analysed these mentioned drugs. As a result, there is a growing need to explore the possible benefits of these drugs on wound healing. Research studies comparing to wound healing may lead to more efficient green oil or kupplai paste.

The objective of this research is to explore the possibilities of combined research studies using both green oil and kupplai *paste* in wound care.

**Objectives:**

**General objectives:**

To do literary study about wound from Ayurvedic and Siddha aspect.

To do literary study about wound from Modern aspect.

**Specific objective:**

To study of efficacy of green oil in the management of chronic wound.

To study of efficacy of Kupplai paste in the management of chronic wound.

**2.1 Methodology**

The entire study consists with 3 parts such as 1. Details about wound from various sources of Indigenous and modern aspect (conceptual), 2. Detailed description of used drug (green oil & Kupplai paste) 3. Clinical study - Patient selected from Rural Ayurvedic Hospital Tellipalai under Dept. of Indigenous medicine, Northern Province.

**2.2 Clinical study**

Patients for this clinical trial are selected randomly from Rural Ayurvedic Hospital Tellipalai out patient, Inpatient Department. This studied on 40 patients with chronic wounds (wounds more than one month) were divided randomly into two groups each 20 patients. Both groups are treated same internal medicine. One group (Group A) treated by green oil and other group (Group B) treated by kupplai paste for external application.

Written informed consent and detailed description Performa/ taken from the patients, prior to start on the examination and treatment. If the patients are unwilling to continue or allergic reaction to the drug, discontinued from the research. Patients are advised to take every day dressing and other internal medicines.

The external drug was applied properly and patients were studied daily and measured assessment criteria on every week. This studied done 8 weeks was assessed. Common health related advices and instructions for both groups mainly dietary and lifestyle.

**2.2.1. Inclusion criteria**

Chronic wound (after one month persist wound), Age group between 30 years to 60 years, Both sexes male and female.

**2.2.2. Exclusive criteria**

Diabetic wound, Cancerous wound, Age group below 30 years and above 60 years, *Agandu* wound.

**2.2.3. Criteria of diagnosis**

The diagnosis is mainly based on the clinical presentation as mentioned in the Ayurvedic and modern scientific aspects. A detailed research project will be prepared accordingly, detailed clinical history, sign & symptoms and also physical examination will be done.

**2.2.4. Assessment criteria**

Wound assessment is not an exact science, but requires the skills and assessment of trained professionals. The following need to be assessed and carefully recorded at each dressing change:

- Size (length x width x depth)
- Wound bed (black, yellow, red, pink)
- Exudates (copious, moderate, mild, none)
- Wound edge (callus and scale, maceration, erythema, oedema)
- Odour (absent, present)
- Patient concerns: pain (persistent, temporary)
- Condition of surrounding skin (normal, oedema, warmth, erythema)
- Clinical signs of critical infection (present, not)

Assessment of the wound is a prerequisite to the selection of an appropriate dressing

### 2.3. Data collection

#### 2.3.1. Objective parameter (wound size)

Objective parameter measured by conducting clinical trial which is 8 weeks of duration. Here used technique to assess wound size (volume) is to measure the three dimensions of length, width, and depth and multiply those measurements by one another ( $L \times W \times D = \text{volume (cm}^3\text{)}$ ). this equation assumes that the base and surface area are the same size. Measurement is to measure the greatest head-to-toe length and the greatest side-to-side width perpendicular (90-degree angle) to each other. Depth can be assessed by placing either a clean cotton-tipped applicator and measuring device into the deepest part of the wound.

This measurement measured by using data collecting sheet and analysis done. Data reported in data collecting sheet.



Figure 2.1. Measurement of length



Figure 2.2. Measurement of depth



Figure 2.3. Measurement of width



Figure 2.4. Scaling of measurement

2.3.2. Subjective parameters

Subjective parameters (Wound bed, Exudates, Wound edge, Odour, pain Condition of surrounding skin, Clinical signs of critical infection) measured by using data collecting sheet which has consisted with scoring scale

1. Wound bed scoring scale

Stage of wound bed	score
Pink	1
Red	2
Yellow	3
Black	4

2. Exudates scoring scale

Stage of Exudates	score
None	1
Mild	2
Moderate	3
Copious	4

3. Wound edge scoring scale

Stage of Wound edge	score
Oedema	1
Erythema	2
Maceration	3
Callus and scale	4

4. Odour scoring scale

Stage of Odour	score
Absent	1
Present	2

5. Pain scoring scale

Stage of Pain	score
No pain	1
Temporary	2
Persistent	3

6. Condition of surrounding skin scoring scale

Condition of surrounding skin	score
Normal	1
Oedema	2
Warmth	3
Erythema	4

7. Clinical signs of critical infection

Stage of Infection	score
Absent	1
Present	2

2.4. Preparation of drug

2.4.1. Identification of raw materials

Raw materials were sent to be identified by the Provincial Department of Indigenous medicine, Northern Province.

2.4.2. Method of preparation

2.4.2.1. Green oil (Pachchai ennai)

Green oil (Pachchai ennai) was prepared by Drug Manufacturing Unit, Northern Province according to the below formula following the standard method of oil preparation which has been mentioned in siddha pharmacopeia.

Materials	Amount
<i>Datura niger</i> leave juice	3.5 liters
<i>Erythrina indica</i> leave juice	1.75 liters
Thurusu (CuSO <sub>4</sub> )	350 gram
Coconut oil	1.4 liters

Identified all ingredients measured the required amount. Thurusu grind and power form. Dissolve thurusu in the leave juice and add oil boil it to proper thailapakam. Filtered the prepared green oil and measured. Then store in suitable bottle and label it.

**2.4.2.2. Kupplai paste**

Kupplai paste was prepared by Drug Manufacturing Unit, Northern Province according to the below formula following the standard method of paste preparation which has been mentioned in traditional method.

Materials	Amount
<i>Vernicazeylanica</i> leave juice	3 Bottles
Camphor	20 g
Wax	125 gram
Coconut oil	1 bottle

Identified all ingredients measured the required amount. Leave juice and oil boil and add camphor to proper paste pakam. Prepared kupplai paste and measured. Then store in suitable packet and label it.



**Figure 2.5. Prepared Green oil and Kupplai paste**

**2.5. Method of indication**

Both groups are treated under same manner. Thripala decoction use for wound cleaning. Every day wound cleaning and dressing. Internally all patients treated Thripala choornam 1g morning & evening after meal, Nilapahal Choornam 1g morning & evening after meal and Kisoraka gugulu one Pill, morning & evening after meal.

Group A was treated by green oil for dressing externally and Group B was treated by Kupplai paste for dressing externally. Patients were advised to keep the wound area carefully.



2.6. Data analysis

Data was analysed under three categories are as follows.

1. Analysis of general information
2. Data obtained by the research Performa
3. Data obtained by the clinical trial

SPSS software is used for the analysis. The basic statistical method used for the statistical analysis. Results were tested under paired T test at 95% (0.05) confidence level.

3.1. Data Analysis and Results

In this chapter it contains data which was analyzed under three categories are as follows.

1. Analysis of general information
2. Data obtained by the research Performa
3. Data obtained by the clinical trial

3.2. Analysis of general information

Sample size 40

Table 3.1 Percentage of male and female patients in the sample.

Male	Female
23	17
57.5%	42.5%

Table 3.2 Percentage of age distribution of patients in the sample

30 – 40	41 – 50	51-60
8	13	19
20%	32.5%	47.5%

Above data can be presented as follows:

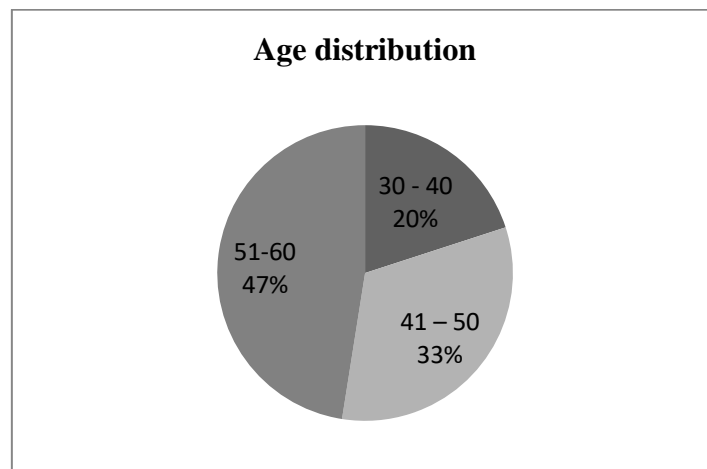


Figure 3.1 Percentage of age distribution of patients in the sample

3.3. Data obtained by the research Performa

Pain was measured by patients concerned. Then calculate the mean value of the pain is every week for group A and Group B separately. Pain decrement can be represented are as follows.

Table 3.3 Mean pain decrement of the patients in the group A

week	1	2	3	4	5	6	7	8
Group A	2.50	2.20	1.80	1.50	1.30	1.20	1.20	1.20

The above data represented as follows:

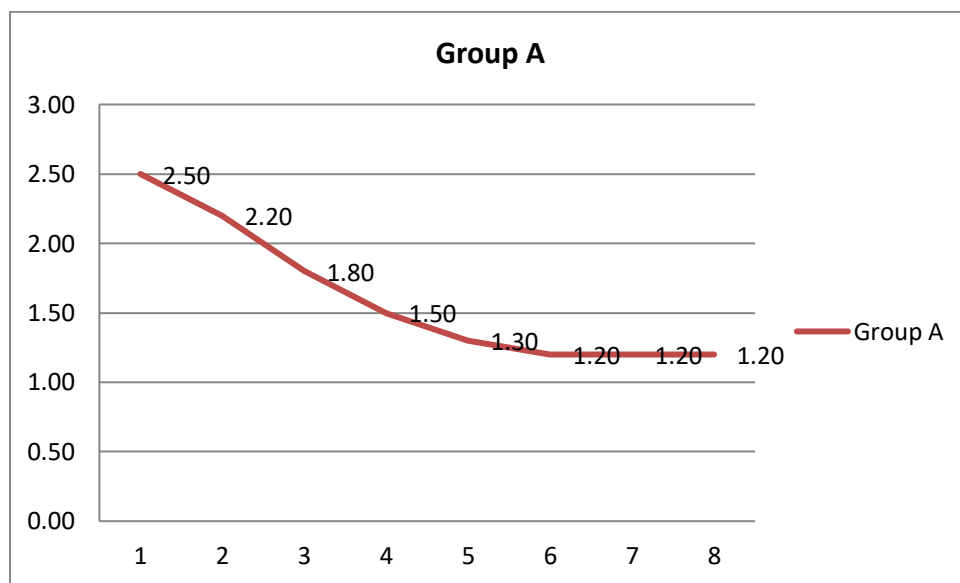


Figure 3.2 Mean pain decrement of the patients in the group A

Table 3.4 Mean pain decrement of the patients in the group B

week	1	2	3	4	5	6	7	8
Group B	2.55	2.10	1.65	1.50	1.30	1.25	1.25	1.25

The above data represented as follows

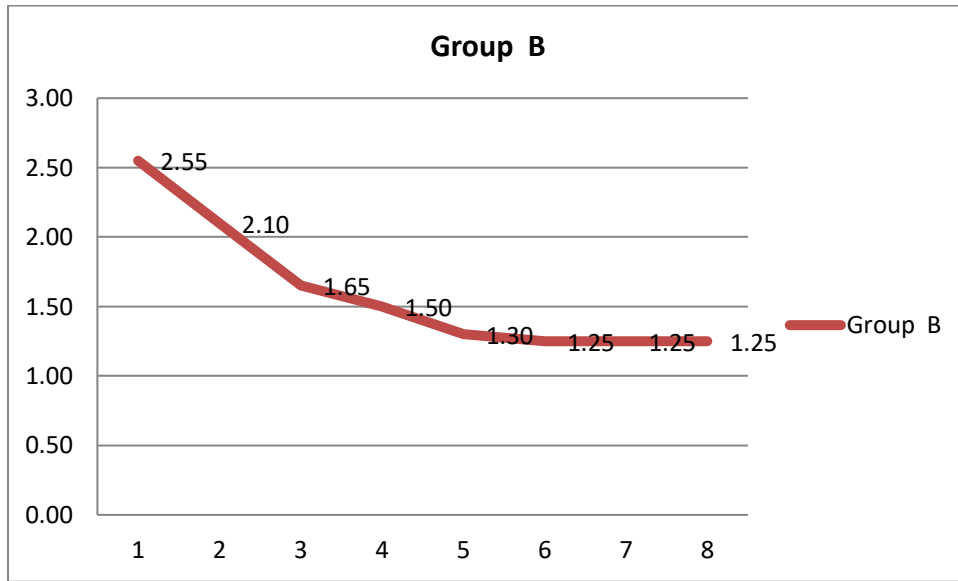


Figure 4.3 Mean pain decrement of the patients in the group B

Table 3.5 Comparison of mean pain decrement of the patients in the group A and Group B

week	1	2	3	4	5	6	7	8
Group A	2.50	2.20	1.80	1.50	1.30	1.20	1.20	1.20
Group B	2.55	2.10	1.65	1.50	1.30	1.25	1.25	1.25

The above data represented as follows

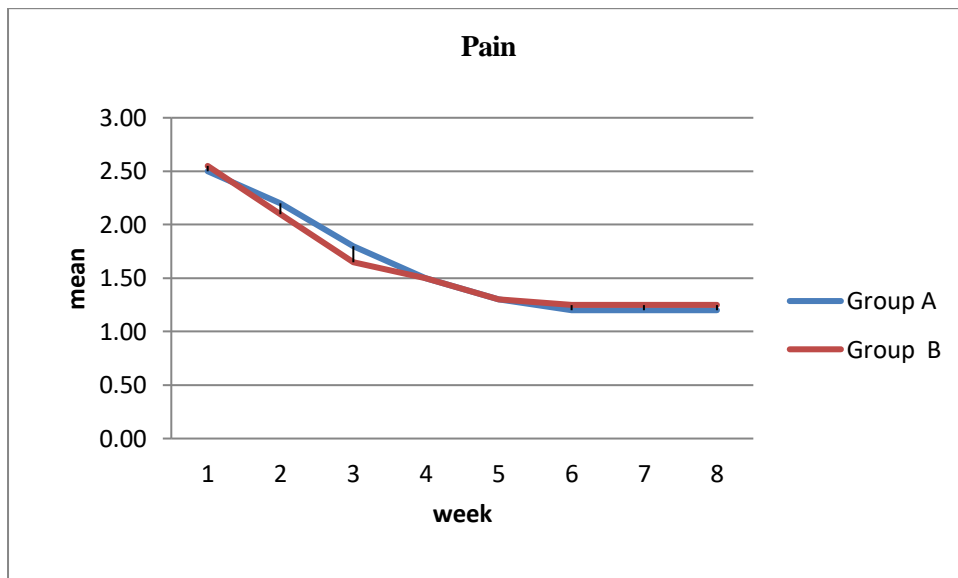


Figure 3.4 Comparison of mean pain decrement of the patients in the group A and Group B

Pain score – Green oil (Group A) Paired T test for Pain score 1<sup>st</sup> and 8<sup>th</sup> week

**Table 3.6 Compare to Paired Samples Statistics for pain in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pain1stweek	2.50	20	.513	.115
	8 <sup>th</sup> week	1.20	20	.410	.092

**Table 3.7 Paired Samples Test for pain in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pain1stweek - 8 <sup>th</sup> week	1.300	.571	.128	1.033	1.567	10.177	19	.000

P < 0.05 at 95 % confidence level

Pain score – Kuppilai paste (Group B) Paired T test for Pain score 1<sup>st</sup> and 8<sup>th</sup> week

**Table 3.8 Compare to Paired Samples Statistics for pain in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	kupain1stweek	2.55	20	.510	.114
	8 <sup>th</sup>	1.25	20	.444	.099

**Table 3.9 Paired Samples Test for pain in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	kupain1stweek - 8 <sup>th</sup>	1.300	.571	.128	1.033	1.567	10.177	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.00) Therefore no difference between both groups in the reduction of pain.

3.4. Data obtained by the clinical trial

1. Wound size:

Calculate the mean value of the size is every week for group A and Group B separately. Size decrement can be represented are as follows.

Table 3.10 Comparison of mean wound size decrement of the patients in the group A and Group B

week	1	2	3	4	5	6	7	8
Group A	16.017	<b>14.415</b>	12.053	10.004	7.458	5.681	4.193	3.286
Group B	24.951	23.686	19.614	16.620	13.365	10.570	8.297	6.473

The above data represented as follows

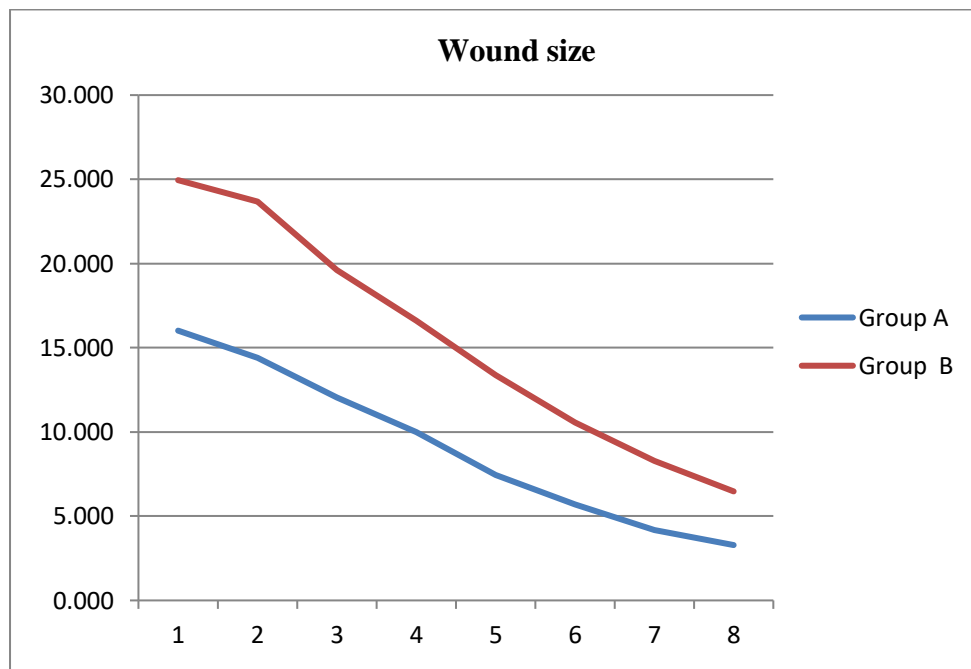


Figure 3.5 Comparison of mean size decrement of the patients in the group A and Group B

Table 3.11 Compare to Paired Samples Statistics for wound size in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A

	Mean	N	Std. Deviation	Std. Error Mean
size 1stweek	16.0167	20	26.217	5.862
8th	3.286	20	9.118	2.039

**Table 3.12 Paired Samples Test for wound size in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A**

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
					Pair 1 size1stweek - 8 <sup>th</sup> week	12.731			

P < 0.05 at 95 % confidence level

**Table 3.13 Compare to Paired Samples Statistics for wound size in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 size1stweek	24.9510	20	28.65782	6.40808
8 <sup>th</sup> week	6.4725	20	15.44715	3.45409

**Table 3.14 Paired Samples Test for wound size in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
					Pair 1 size1stweek - 8 <sup>th</sup> week	18.47850			

P < 0.05 at 95 % confidence level

P values of group A (P = 0.005) > P values of group B(P = 0.000), therefore reduction of the wound size in the Group B (Kuppilai paste) is more significant than Group A (Green oil).

**2. Wound Bed**

Calculate the mean value of the score of wound bed is every week for group A and Group B separately. Wound bed changes can be represented are as follows.

**Table 3.15 Comparison of mean value of wound bed changes of the patients in the group A and Group B**

week	1	2	3	4	5	6	7	8
GroupA	3.550	3.150	2.800	2.200	1.900	1.600	1.400	1.300
GroupB	3.550	2.900	2.400	2.050	1.700	1.600	1.400	1.300

The above data represented as follows:

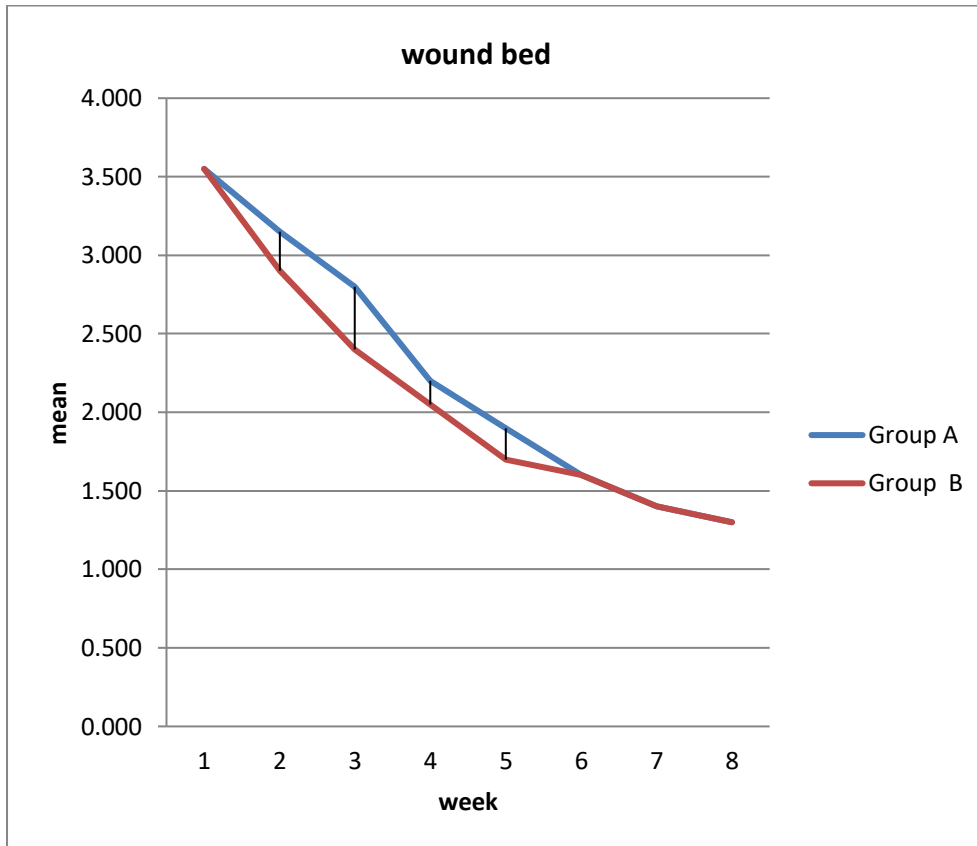


Figure 3.6 Comparison of mean value of wound bed changes of the patients in the group A and Group B

Table 3.16 Compare to Paired Samples Statistics for wound bed changes in the 1st week and 8<sup>th</sup> week of the patients in the Group A

Pair 1	w. bed1stweek 8 <sup>th</sup> week	Mean	N	Std. Deviation	Std. Error
		3.550	20	.5104	.1141
		1.300	20	.4702	.1051

Table 3.17 Paired Samples Test for wound bed changes in the 1st week and 8<sup>th</sup> week of the patients in the Group A

Pair 1	wbed1stweek - 8 <sup>th</sup> week	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
		2.250	0.716	0.160	1.915	2.585	14.047	19	.000

P < 0.05 at 95 % confidence level

**Table 3.18 Compare to Paired Samples Statistics for wound bed changes in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

	Mean	N	Std. Deviation	Std. Error
Pair 1 w. bed1stweek	3.550	20	.6048	.1352
8 <sup>th</sup> week	1.300	20	.4702	.1051

**Table 3.19 Paired Samples Test for wound bed changes in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	w. bed1stweek - 8 <sup>th</sup> week	2.250	0.550	0.123	1.993	2.507	18.291	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the changes of wound bed.

### 3. Exudates

Calculate the mean value of the score of amounts of the exudates is monitored every week for group A and Group B separately. Exudates changes can be represented are as follows

**Table 3.20 Comparison of mean score of exudates changes of the patients in the group A and Group B**

week	1	2	3	4	5	6	7	8
Group A	3.050	2.700	2.000	1.700	1.400	1.200	1.200	1.200
Group B	2.900	2.250	1.800	1.500	1.400	1.250	1.100	1.100

The above data represented as follows:



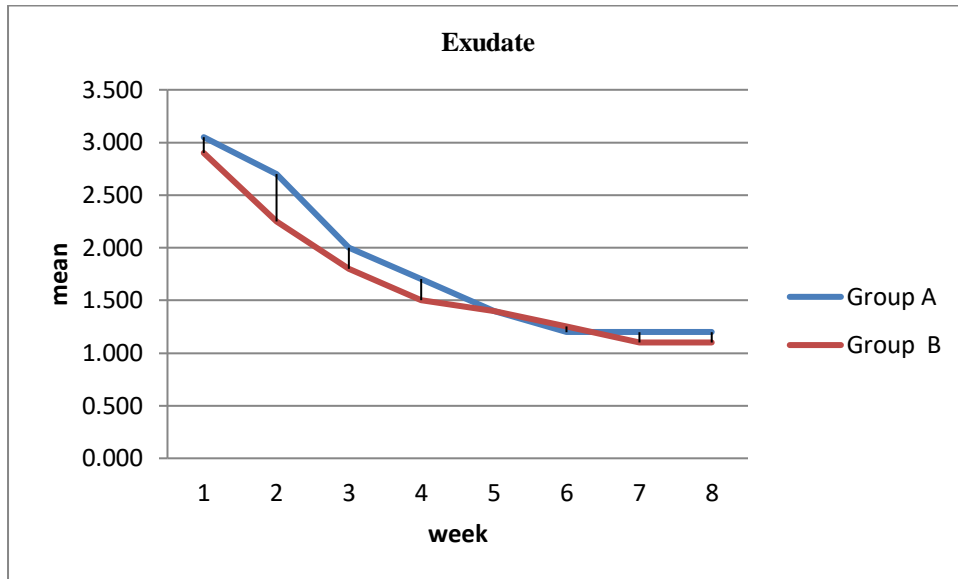


Figure 3.7 Comparison of mean Exudates changes of the patients in the group A and Group B

Table 3.21 Compare to Paired Samples Statistics for exudates changes in the 1st week and 8<sup>th</sup> week of the patients in the Group A

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 exudate1stweek	3.050	20	.7592	.1698
8 <sup>th</sup> week	1.200	20	.4104	.0918

Table 3.22 Paired Samples Test for exudates changes in the 1st week and 8<sup>th</sup> week of the patients in the Group A

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 exudate1stweek - 8 <sup>th</sup> week	1.8500	.6708	.1500	1.5360	2.1640	12.333	19	.000

P < 0.05 at 95 % confidence level

Table 3.23 Compare to Paired Samples Statistics for exudates changes in the 1st week and 8<sup>th</sup> week of the patients in the Group B

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 1stweek	2.900	20	.7182	.1606
8 <sup>th</sup> week	1.100	20	.3078	.0688

Table 3.24 Paired Samples Test for exudates changes in the 1st week and 8<sup>th</sup> week of the patients in the Group B

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 1 <sup>st</sup> week - 8 <sup>th</sup> week	1.8000	.7678	.1717	1.4407	2.1593	10.485	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the exudate's changes.

#### 4. Wound edge

Calculate the mean value of the score of wound edge is monitored every week for group A and Group B separately. Wound edge changes can be represented are as follows

Table 3.25 Comparison of mean value of wound edge changes of the patients in the group A and Group B

week	1	2	3	4	5	6	7	8
Group A	2.35	2.15	1.68	1.00	0.68	0.40	0.20	0.10
Group B	2.50	2.70	1.60	1.00	0.70	0.55	0.40	0.30

The above data represented as follows:

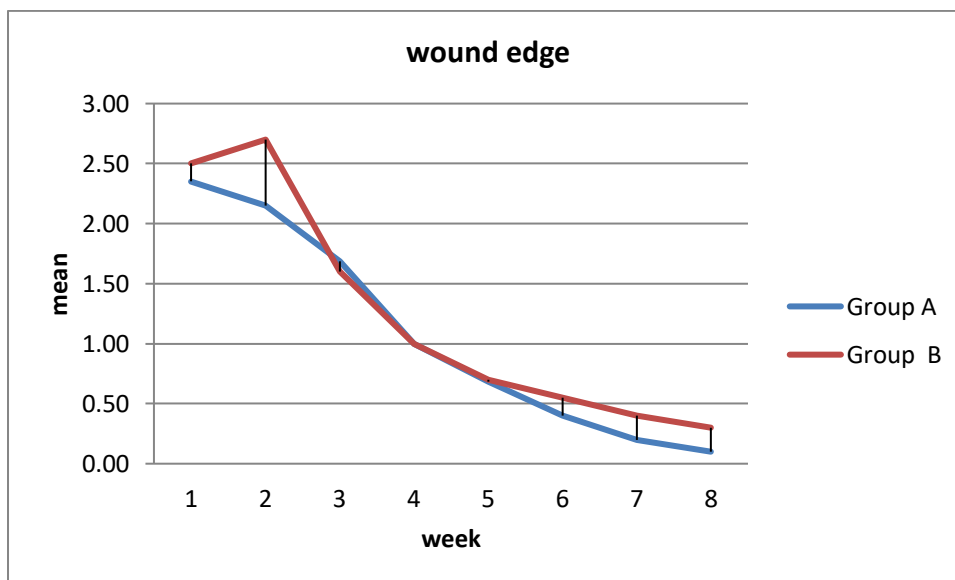


Figure 3.8 Comparison of mean score of wound edge changes of the patients in the group A and Group B

Table 3.26 Compare to Paired Samples Statistics for wound edge in the 1st week and 8th week of the patients in the Group A

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	edge1stweek	2.350	20	1.1367	.2542
	8 <sup>th</sup> week	.100	20	.3078	.0688

Table 3.27 Paired Samples Test for wound edge in the 1st week and 8<sup>th</sup> week of the patients in the Group A

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Edge 1st week - 8 <sup>th</sup> week	2.2500	1.0190	0.2270	1.7720	2.7271	9.869	19	.000

P < 0.05 at 95 % confidence level

Table 3.28 Compare to Paired Samples Statistics for wound edge in the 1st week and 8<sup>th</sup> week of the patients in the Group B

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	edge1st week	2.50	20	1.051	.235
	8 <sup>th</sup> week	.30	20	.571	.128

Table 3.29 Paired Samples Test for wound edge in the 1st week and 8<sup>th</sup> week of the patients in the Group B

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	kuedg1stweek - 8 <sup>th</sup> week	2.200	.894	.200	1.781	2.619	11.000	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the wound edge changes.

5. Odour

Table 3.30 Comparison of mean value of odour decrement of the patients in the group A and Group B

week	1	2	3	4	5	6	7	8
Group A	1.85	1.65	1.40	1.30	1.15	1.15	1.15	1.15
Group B	1.95	1.70	1.35	1.35	1.25	1.15	1.10	1.10

The above data represented as follows:

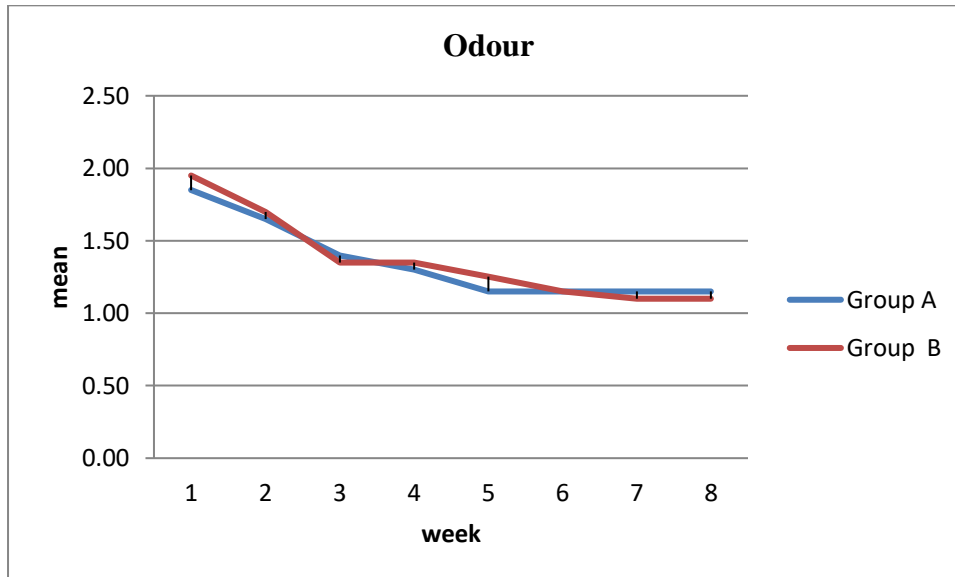


Figure 3.9 Comparison of mean odour decrement of the patients in the group A and Group B

Table 3.31 Compare to Paired Samples Statistics for wound odour in the 1st week and 8<sup>th</sup> week of the patients in the Group A

		Mean	N	Std. Deviation	Std. Error
Pair 1	oder1stweek	1.85	20	.366	.082
	8 <sup>th</sup> week	1.15	20	.366	.082

Table 3.32 Paired Samples Test for wound odour in the 1st week and 8<sup>th</sup> week of the patients in the Group A

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
					Pair 1	oder1stweek - 8 <sup>th</sup> week			

P < 0.05 at 95 % confidence level

Table 3.33 Compare to Paired Samples Statistics for wound odour in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 kuoder1stweek	1.95	20	.224	.050
8 <sup>th</sup> week	1.10	20	.308	.069

Table 3.34 Paired Samples Test for wound odour in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 oder1stweek - 8 <sup>th</sup> week	.850	.366	.082	.679	1.021	10.376	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the wound odour changes.

6. Condition of surrounding skin

Table 3.35 Comparison of mean value of surrounding Skin change of the patients in the group A and Group B

Week	1	2	3	4	5	6	7	8
Group A	2.65	2.25	1.75	1.35	1.21	1.15	1.00	1.00
Group B	2.95	2.40	1.85	1.50	1.40	1.25	1.20	1.20

The above data represented as follows

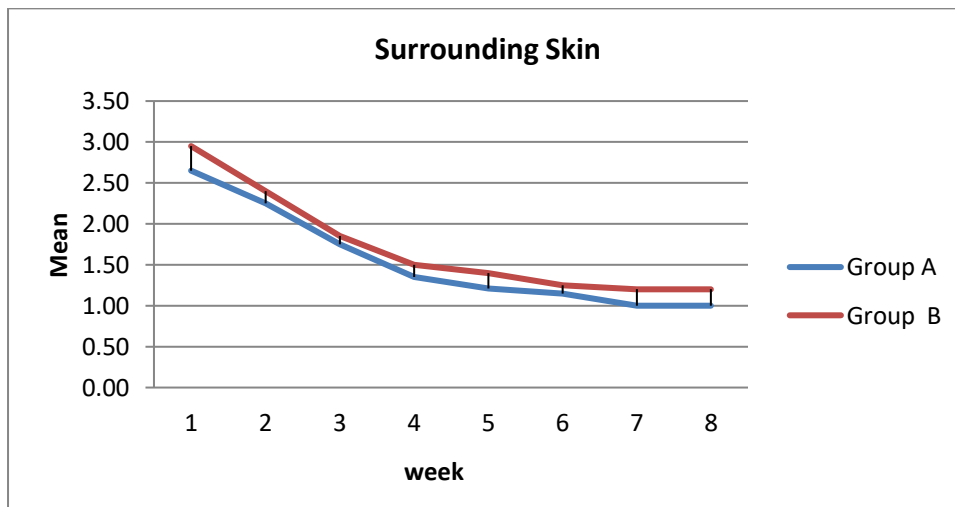


Figure 3.10 Comparison of mean surrounding Skin change of the patients in the group A and Group B

Table 3.36 Compare to Paired Samples Statistics for surrounding Skin change in the 1st week and 8<sup>th</sup> week of the patients in the Group A

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	sskin1stweek	2.650	20	1.089	.244
	8 <sup>th</sup> week	1.000	20	0.000	0.000

Table 3.37 Paired Samples Test for surrounding Skin change in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 sskin1stweek - 8 <sup>th</sup> week	1.6500	1.0894	.2436	1.1401	2.1599	6.773	19	.000

P < 0.05 at 95 % confidence level

Table 3.38 Compare to Paired Samples Statistics for surrounding Skin change in the 1st week and 8<sup>th</sup> week of the patients in the Group B

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	kususkin1stweek	2.95	20	.887	.198
	8 <sup>th</sup> week	1.20	20	.410	.092

Table 3.39 Paired Samples Test for surrounding Skin change in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 kususkin1stweek - 8 <sup>th</sup> week	1.750	0.716	.160	1.415	2.085	10.925	19	.000

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the surrounding Skin change

7. Clinical signs of critical infection

Table 3.40 Comparison of mean value of Clinical signs of critical infection of the patients in the group A and Group B

Week	1	2	3	4	5	6	7	8
Group A	1.85	1.80	1.45	1.25	1.15	1.15	1.00	1.00
Group B	1.85	1.75	1.60	1.45	1.30	1.30	1.20	1.15

The above data represented as follows:

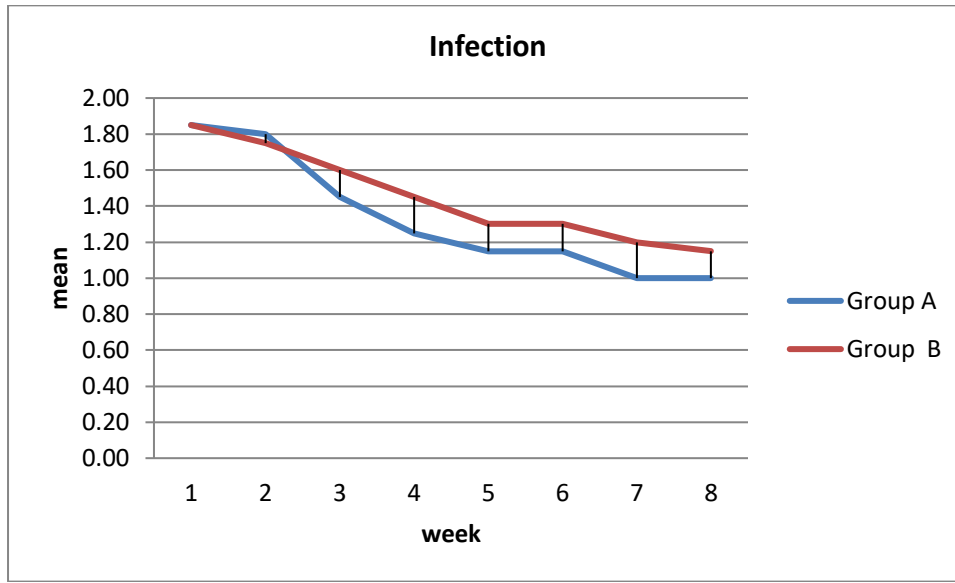


Figure 3.11 Comparison of mean value of Clinical signs of critical infection of the patients in the group A and Group B

Table 3.41 Compare to Paired Samples Statistics for Clinical signs of critical infection in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	inec1stweek	1.850	20	.3663	.0819
	8 <sup>th</sup> week	1.000	20	0.0000	0.0000

Table 3.42 Paired Samples Test for Clinical signs of critical infection in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group A

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 inec1stweek - 8 <sup>th</sup> week	.8500	.3663	.0819	.6785	1.0215	10.376	19	.000

P < 0.05 at 95 % confidence level

**Table 3.43 Compare to Paired Samples Statistics for Clinical signs of critical infection in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	kuinf1stweek	1.85	20	.366	.082
	8 <sup>th</sup> week	1.15	20	.366	.082

**Table 3.44 Paired Samples Test for Clinical signs of critical infection in the 1<sup>st</sup> week and 8<sup>th</sup> week of the patients in the Group B**

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
					Pair 1	kuinf1stweek - 8 <sup>th</sup> week			

P < 0.05 at 95 % confidence level

P values of both groups are same (P =0.000) Therefore no difference between both groups in the Clinical signs of critical infection change.

**4.1. Discussions**

The majority of patients were in 51 -60 age group (47.5 %) followed by 41-50 age group (32.5 %) and 30 - 40 age group (20 %) which indicates that the 51 - 60 age groups (Table 4.2) are more vulnerable to chronic wound. These age groups might engage in heavy works such as farming, labor works, etc. and also they are not serious mind to their illness. Therefore, they didn't take proper treatment or dressing for their wound, due to that wound become a chronic wound.

The majority of patients were male (57.5%) but 42.5% number of female patients (Table 4.1) were also reported. which indicate that males are more affected by chronic wound. Males are physically more active and they might engage in heavy works that may be the reason to have increased incidence of male.

The wound assessment criterias were evaluated Group A and Group B separately for start of treatment (1st week) and end of treatment (8th week).

The group A pain mean value for 1st week 2.50 8th week 1.20 (Table 4.6). The mean difference is 1.30 (Table 4.7). The group B pain mean value for 1st week 2.55 8th week 1.25 (Table 4.8). The mean difference is 1.30 (Table 4.9). Therefore, no difference between both groups for reduction of pain.

The group A wound size mean value for 1st week 16.0167 8th week 3.286 (Table 4.11). The mean difference is 12.731 (Table 4.12). The group B wound size mean value for 1st week 24.951 8th week 6.472 (Table 4.13). The mean difference is 18.478 (Table 4.14). Therefore, mean difference for wound size group B greater than group A.

The group A wound bed mean value for 1st week 3.55 8th week 1.30 (Table 4.16). The mean difference is 2.25 (Table 4.17). The group B wound bed mean value for 1st week 3.55 8th week 1.30 (Table 4.18). The mean difference is 2.25 (Table 4.19). Therefore, no difference in the changes of wound bed.



The group A exudates mean value for 1st week 3.05 8th week 1.20 (Table 4.21). The mean difference is 1.85 (Table 4.22). The group B wound size mean value for 1st week 2.90 8th week 1.10 (Table 4.23). The mean difference is 1.80 (Table 4.24). Therefore, mean difference for exudates group B 0.05 greater than group A.

The group A wound edge mean value for 1st week 2.35 8th week 0.100 (Table 4.26). The mean difference is 2.250 (Table 4.27). The group B wound edge mean value for 1st week 2.50 8th week 0.30 (Table 4.28). The mean difference is 2.20 (Table 4.29). Mean difference for wound edge group A greater than group B.

The group A wound odour mean value for 1st week 1.85 8th week 1.15 (Table 4.31). The mean difference is 0.700 (Table 4.32). The group B wound odour mean value for 1st week 1.95 8th week 1.10 (Table 4.33). The mean difference is 0.85 (Table 4.34). Mean difference for wound odour group B greater than group A.

The group A condition of surrounding skin mean value for 1st week 2.65 8th week 1.00 (Table 4.36). The mean difference is 1.65 (Table 4.37). The group B condition of surrounding skin mean value for 1st week 2.95 8th week 1.20 (Table 4.38). The mean difference is 1.75 (Table 4.39). Mean difference for condition of surrounding skin group B greater than group A.

The group A clinical signs of critical infection mean value for 1st week 1.85 8th week 1.00 (Table 4.41). The mean difference is 0.85 (Table 4.42). The group B clinical signs of critical infection mean value for 1st week 1.85 8th week 1.15 (Table 4.43). The mean difference is 0.700 (Table 4.44). Mean difference for clinical signs of critical infection group A greater than group B.

These both medicines have the coconut oil is the one of the main ingredients. Coconut oil has been used for wound healing since time immemorial. Three of the identified mechanisms behind these healing effects are its ability to accelerate re-epithelialization, improve antioxidant enzyme activity, and stimulate higher collagen cross-linking within the tissue being repaired and action of pharmacodynamic properties, anti-inflammatory, analgesic, anti oxidant, muscles relaxant and antifungal properties, which give wound healing.

Green oil comprises mainly *Datura niger* leave juice, *Erythrina indica* leave juice and Thurusu ( $\text{CuSO}_4$ ). *Datura niger* has Major Chemical constituents of Scopolamine, Daturadiol, Hyoscyamine, Fastudine, Allantoin, Niacin, Vitamin C, Tropine, Noratropine, Meteolodine, hyosine, Fastusic acid etc. It improves skin quality, helps in quick wound healing, helps to relieve pain and inflammation, detoxifies skin and relieves itching and infested wounds.

(E.,Tischler,J. and Ludsteck, M.1989) *Erythrina indica* has mainly alkaloids, flavonoids, triterpenoids, and lectin.. The alkaloids are reported to have anti-inflammatory and analgesic, antiseptic, and as an astringent activity. flavonoids having antibacterial and anthelmintic activity. Therefore, helps to pain reliever, decrement of wound size and infection. (Atanasov, Atanas G 2015) Thurusu ( $\text{CuSO}_4$ ) has analgesic, antifungal and dehydration of the wound. It also helps to wound healing. All these ingredients possess to green oil to effect and efficacy of wound healing (Kokkoros, P. A.; Rentzeperis, P. J. 1958) Kuppilai paste comprises mainly *Vernonica zeylanica* leave juice and Camphor. *Vernonica zeylanica* has Major Chemical constituents Friedelin, 3 beta -friedlinol, lupenol acetate, beta amyrrin acetate. Phytochemical analysis revealed the presence of alkaloids, phenols, and steroids, which could contribute to the antinociceptive action. It helps in quick wound healing, helps to relieve pain and inflammation (Atanasov, Atanas G 2015) Camphor is readily absorbed through the skin, producing either a coolness or warmth sensation, or acts as slight local anaesthetic and antimicrobial substance. It seems to stimulate nerve endings that relieve symptoms such as pain and itching when applied to the skin. Camphor is also active against fungi that cause infections in the wound (Green, B. G. 1990)

## 4.2. Conclusions

In the group A and group B mean differences of pain and wound bed are same. wound size, exudates, odour, surrounding Skin mean difference group B greater than group A. wound edge, Clinical signs of critical infection

mean difference group A greater than group B. therefore both drugs are effective and statistically significant. But group B drug kupplai paste more effective than group A drug green oil.

In the group A and Group B mean changes or decrement of pain ,wound bed, exudates, wound edge wound odour, surrounding Skin, Clinical signs of critical infection, P values = 0.00 95% confidence level  $P < 0.05$  both groups are same ( $P = 0.000$ ) Therefore no difference between both groups and It shows statistically significant. In the group A (Green oil) in the mean decrement of wound size P value  $p = 0.005$  at 95% confidence level  $P < 0.05$ . It shows a significant decrement of the wound size of the chronic wound statistically in 95% confidence level. In the group B ( Kupplai paste) in the mean decrement of wound size P value  $p = 0.000$  at 95% confidence level  $P < 0.05$ . It shows a significant decrement of the wound size of the chronic wound statistically in 95% confidence level.

But mean decrement of wound size of the group B greater than that of group A, which means group B more statistically significant.

It is concluded that the application of kupplai paste can be used more effective than Green oil on healing of the wound management.

Green oil comprises mainly *Datura niger* leave juice *Erythrina indica* leave juice and Thurusu ( $\text{CuSO}_4$ ). All these drugs posses mainly anti microbial, anti-inflammatory and analgesic, antiseptic, and as an astringent, antifungal activity.

Kupplai paste comprises mainly *Vernonica zeylanica* leave juice, Camphor Wax. all these drugs possess mainly an antinociceptive, analgesic, antibacterial, antispasmodic, antiseptic, decongestant, anesthetic, sedative , anti-inflammatory, disinfectant, insecticide substance and astringent,

Pharmacological effect also shows that the Kupplai paste has many substances to promote wound healing. Finally, based on the observed results and the pharmaco dynamic properties of both drugs, it may be concluded that Kupplai paste is more effective than Green oil.

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