

# Effect Of Naturopathic Treatment - Cold Plantar Douche On Constipation

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## **Abstract:**

**Background:** Constipation is an unsatisfactory defecation which is characterised by the presence of infrequent stools passage or difficult stool passage or both. The short term plantar douche with cold water under strong pressure is strongly exiting and increasing the activity of the blood vessels and lymphatics both in cutaneous surface and internal areas which are connected to them in reflex. Hence, plantar douche may decrease the constipation symptoms by increasing peristaltic movements of the intestines.

**Objective:** The objective is to evaluate the effect of cold plantar douche on constipation symptoms and gastric motility in individuals with functional constipation.

**Materials and Methods:** Subjects were recruited from the outpatient department of SDM Naturopathy Hospital, Ujire and Shanthivana, Dharmastala who satisfied the selection criteria and gave consent to participate in the study. 60 subjects in total were randomly assigned to either an experimental or a control group. The experimental group (n=30) were given cold plantar douche intervention along with high fibre diet for 8 days. Control group (n=30) followed only high fibre diet. Assessments were made for both the groups on day 1 and day 8. The assessments included were constipation assessment scale (CAS), constipation severity scale (CSS), patient assessment of constipation-quality of life (PACQOL) and Electrogastrogram (EGG). Data Analysis was done using Statistical Analysis Software [statistical package for social sciences (SPSS) for Windows 20.0]. Significance was determined with  $p=0.05$  or less

**Results:** Study showed, significant decrease in CAS ( $p=0.0001$ ), CSS ( $p=0.0001$ ), and PACQOL ( $p=0.0001$ ) scorings in experimental group, no significant changes in fasting EGG of both the groups and significant increase in the post prandial EGG ( $p=0.0001$ ) in experimental group when compared to control group.

**Conclusion:** Cold plantar douche with high fibre diet found beneficial in the management of constipation by reducing its severity and improving the gastric motility compared to only high fibre diet.

**Keywords:** Cold plantar douche; constipation; EGG

## I. INTRODUCTION

Constipation is widely defined as an unsatisfactory defecation which is characterised by the presence of infrequent stools passage or difficult stool passage or both.<sup>[1]</sup>

Constipation is the common gastrointestinal complaint in an evidently healthy population as well as in the patients having various predisposing disorders with approximately 12% to 19% of global prevalence. The high prevalence rate, economic burden and adverse implications on the health related quality

of life, make the constipation a major public health issue. Primary or Functional constipation, also known as Chronic Idiopathic Constipation (CIC), is the on-going symptom for more than six months which may have only a neurological, psychological or psychosomatic issue. A person who is having functional constipation may be healthy, yet having the difficult defecation. The studies have shown that these individuals will have poor abdominal tone and sluggish colonic movements leading to the complications like haemorrhoids and rectal prolapse. The intestinal immotility leads to antral hypomotility causing gastric stasis. Functional constipation is diagnosed using the diagnostic criteria- Rome 3 criteria of functional bowel disorders. Treatment of constipation, with irrespective of the cause is initiated from life style modification, and is the most empirical, simple, helpful measure which includes educating the patient, adequate fluid intake, dietary fibres supplementation and regular physical activity. Though various treatment options are available for the management of constipation, evidence for their efficacy and safety are limited. And some non-pharmacological treatments like enema, colon irrigation etc., relieve constipation symptoms but they may also reduce the intestinal tone when used for long duration. The quote, "Deposit of metabolic end products or morbid matter is disease" is one among the basic principles of Nature Cure. According to this principle, the accumulation of morbid matter through gastrointestinal tract (one among the types of morbid matter) leads to the lowered vitality and disease. Accumulation of morbid matter is also a primary cause of disease i.e., due to the violation of nature's laws. Hydrotherapy uses Douche treatment as the first line of treatment in the management of various disorders. One of the most valuable uses of the douche is in its applications to certain well defined cutaneous areas with special reference to the internal organs connected with them. The effect of localised douches depends upon not only the duration, temperature, pressure and mass of water employed, but also upon the particular surface to which the application is made. Short applications of cold water with strong pressure are strongly exciting, producing powerful circulatory reaction with dilatation of blood vessels and increased activity of the blood vessels and Lymphatics both in cutaneous surface to which water is applied and in the internal areas which are connected to them in reflex.

Evidence regarding the use of plantar douche for treating constipation is limited. Hence, this study is designed to evaluate the use of cold plantar douche on relieving constipation related symptoms and changing gastric motility in individuals with functional constipation.

## II. MATERIALS AND METHODS

### SUBJECTS

The study population was selected from OPD of SDM Naturopathy Hospital, Ujire and Shanthivana, Dharmasthala. After the initial screening, almost 68 subjects were selected based on their detailed case history. All the 68 subjects were given detailed information regarding the study and were asked to go through the consent form. Later 60 subjects were finally

recruited, based on the selection criteria and who gave consent to participate in the study. 60 subjects in total were randomly assigned to an experimental group (n=30) and a control group (n=30) using chit method.

### INCLUSION CRITERIA

Age: 18 to 65 years

Gender: male & female

People who were suffering from functional constipation as per diagnostic criteria and who are willing to give consent for participation in the study.

### EXCLUSION CRITERIA

Patients with IBS, fissures and fistula, haemorrhoids, hernia, IHD, liver and lung diseases, neurological disorders like Parkinsonism, Cancer, DM, hypothyroidism, abdominal surgeries, familial intestinal polypoid syndrome, IBD and psychiatric disorders.

No history of lactose intolerance, colorectal cancer, recent cerebrovascular accident/ stroke, spinal cord injury and disc herniation causing bowel symptoms. Use of analgesics or opioids in last week.

### STUDY DESIGN

Randomised control trial.

## III. METHOD

Subjects satisfying the selection criteria and who have agreed to give consent for participation in the study were assessed at baseline and randomized to either receive cold plantar douche daily once for 2 minutes, for 8 days or serve as subjects in control group. 2 sets of constipation questionnaires i.e., CAS and CSS were asked on day 1 for both the groups and 3 sets of constipation questionnaires i.e., CAS, CSS and PAC-QOL were asked on day 8 for both the groups. EGG was done for 30 min on fasting state of 6-8 hours followed by another 30 min on post prandial state, for both intervention and control group on 1<sup>st</sup> day and 8<sup>th</sup> day apart from other assessments.

### STUDY INTERVENTION

#### TEST INTERVENTION

Cold plantar douche for all 30 patients was given daily morning for 2 minutes in the empty stomach, under same environmental conditions where the temperature of water was maintained at 55<sup>0</sup>F with the help of water thermometer and at 40 lbs pressure which was regulated by pressure gauze. Along with the cold plantar douche intervention, all subjects were also advised to follow normal diet at home with slight modifications like high fibre diet and intake of enough of water and none of the subjects were under any laxative drugs during this period of 8 days.

**CONTROL INTERVENTION**

The subjects assigned to this group were not given any intervention but only advised to follow normal diet at home with little modification like high fibre diet and intake of water and none of the subjects were under any laxative drugs during this period of 8 days.

**DATA ANALYSIS**

Appropriate statistical tests were done to assess mean difference across the baseline (pre) and endpoint (post) based on the quality of data normality and distribution. These tests were done using Statistical Analysis Software- Statistical Package for Social Sciences (SPSS for Windows version 20.0). Significance was determined with  $\alpha=0.05$  or less. Normality test was done by Kolmogorov Smirnov test method.

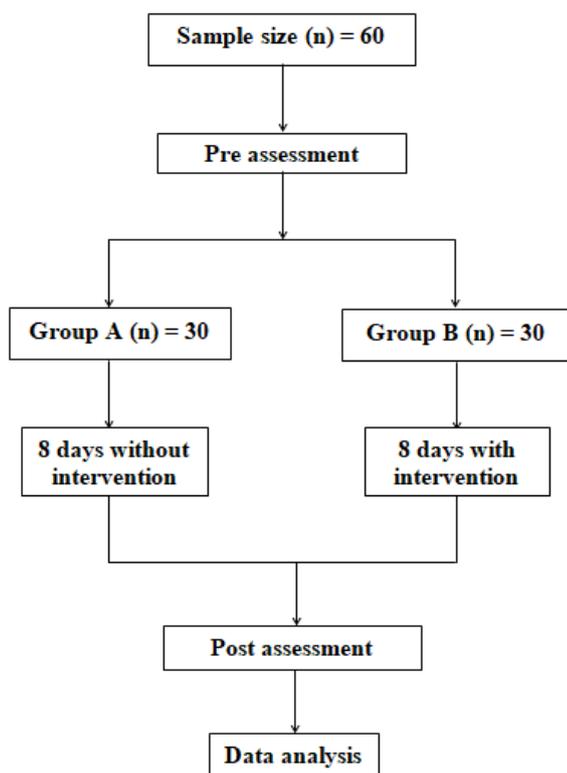


Figure 1: Illustration of the study

**IV. RESULTS**

All patients were aged between 18 to 65 years (mean age is 34.40 in total) which was depending on the availability of study population. The patient’s demographic data is given in Table-1. Subjects distribution has  $p=0.0062$  which is obtained by using chi-square t test=7.5001.

	Control group	Experimental group	Total
<b>Males</b>	15	5	20
<b>Females</b>	15	25	40
<b>Age (mean)</b>	36.30	32.50	34.40
<b>Age(SD)</b>	13.72	12.03	12.94

Chi-square= 7.5001 P = 0.0062\* [ $*p<0.05$ ]

Table 1: Demographic data of the subjects

Variable	Group	Mean	SD	SE	t-value	p-value
<b>Before treatment</b>	<b>Control group</b>	12.23	1.85	0.34	-	0.4870
	<b>Experiment group</b>	12.43	1.28	0.23		
<b>After treatment</b>	<b>Control group</b>	4.33	1.40	0.26	8.6825	0.0001*
	<b>Experiment group</b>	1.27	1.34	0.24		

\* $p<0.05$

Table 2: Comparison of control and experiment groups with respect to CAS scores

There was significant decrease in CAS scores in experimental group ( $p=0.0001$ ) after the intervention period than in the control group (Table-2, Independent t test)

Group	Treatment	Mean	SD	% of change	Paired t	p-value
<b>Control group</b>	<b>Before treatment</b>	12.23	1.85	64.58	22.9933	0.0011*
	<b>After treatment</b>	4.33	1.40			
<b>Experiment group</b>	<b>Before treatment</b>	12.43	1.28	89.81	33.9418	0.0001*
	<b>After treatment</b>	1.27	1.34			

\* $p<0.05$

Table 3: Comparison of before and after treatment CAS scores in control and experiment groups (comparison within the groups)

There was significant decrease in CAS scoring following the treatment within the experimental group ( $p=0.0001$ ) and also in control group but is significant at  $p=0.0011$  (Table-3, Dependent t test).

Variable	Group	Mean	SD	SE	t-value	p-value
<b>Before treatment</b>	<b>Control group</b>	13.73	2.70	0.49	-	0.9547
	<b>Experiment group</b>	13.77	1.72	0.31		
<b>After treatment</b>	<b>Control group</b>	6.20	1.73	0.32	6.2904	0.0001*
	<b>Experiment group</b>	3.47	1.63	0.30		

\* $p<0.05$

Table 4: Comparison of control and experiment groups with respect to CSS scores

There was significant decrease in CSS scores in experimental group ( $p=0.0001$ ) after the intervention period (Table-4, Independent t test).

Group	Treatment	Mean	SD	% of change	Paired t	p-value
<b>Control group</b>	<b>Before treatment</b>	13.73	2.70	54.85	15.9751	0.0010*
	<b>After treatment</b>	6.20	1.73			
<b>Experiment group</b>	<b>Before treatment</b>	13.77	1.72	74.82	23.5587	0.0001*
	<b>After treatment</b>	3.47	1.63			

\* $p<0.05$

Table 5: Comparison of before and after treatment CSS scores in control and experiment groups (comparison within the groups)

There was significant decrease in the CSS scoring following the treatment within the experimental group ( $p=0.0001$ ) and also in control group but is significant at  $p=0.0010$  (Table-5, Dependent t test).

Group	Mean	SD	SE	t-value	p-value
Control group	36.47	9.58	1.75	8.0620	0.0001*
Experiment group	12.90	12.83	2.34		

\* $p<0.05$

Table 6: Comparison of control and experiment groups with respect to PACQOL scores

There was significant improvement in quality of life of experimental group ( $p=0.0001$ ) following treatment with mean value 12.90 and standard deviation 12.83 than in control group (Table-6, Independent t test).

Group	Mean	SD	SE	t-value	p-value
Control group	10.03	3.16	0.58	-4.7717	0.0001*
Experiment group	13.17	1.72	0.31		

\* $p<0.05$

Table 7: Comparison of control and experiment groups with respect to satisfaction scores in PACQOL

Significantly more satisfaction was observed within the experimental group ( $p=0.0001$ ) after the intervention period than in the control group (Table-7, Independent t test).

Variable	Group	Mean	SD	SE	t-value	p-value
Before treatment	Control group	1.76	0.58	0.11	0.7930	0.4310
	Experiment group	1.64	0.64	0.12		
After treatment	Control group	1.79	0.59	0.11	-0.2002	0.8420
	Experiment group	1.82	0.49	0.09		

\* $p<0.05$  (Independent t test)

Table 8: Comparison of control and experiment groups with respect to fasting EGG scores

Group	Treatment	Mean	SD	% of change	Paired t	p-value
Control group	Before treatment	1.76	0.58	-1.63	-0.4170	0.6798
	After treatment	1.79	0.59			
Experiment group	Before treatment	1.64	0.64	-	-1.3380	0.1913
	After treatment	1.82	0.49			

\* $p<0.05$  (Dependent t test)

Table 9: Comparison of before and after treatment fasting EGG scores in control and experiment groups (comparison within the groups)

There was no significant change in the EGG of fasting state among both the groups (Table-8, Table-9).

Variable	Group	Mean	SD	SE	t-value	p-value
Before treatment	Control group	1.89	0.56	0.10	0.3540	0.7246
	Experiment group	1.85	0.43	0.08		
After treatment	Control group	1.78	0.61	0.11	-11.5917	0.0001*
	Experiment group	3.84	0.76	0.14		

\* $p<0.05$  (Independent t test)

Table 10: Comparison of control and experiment groups with respect to postprandial EGG scores

Group	Treatment	Mean	SD	% of change	Paired t	p-value
Control group	Before treatment	1.89	0.56	5.96	1.5545	0.1309
	After treatment	1.78	0.61			
Experiment group	Before treatment	1.85	0.43	-107.73	-15.0558	0.0001*
	After treatment	3.84	0.76			

\* $p<0.05$  (Dependent t test)

Table 11: Comparison of before and after treatment postprandial EGG scores in control and experiment groups (comparison within the groups)

There was significant increase in EGG values in experimental group with respect to post prandial (after test meal) state ( $p=0.0001$ ) after the intervention period (Table-10 and Table-11).

## V. DISCUSSION

The main aim of the study was to evaluate the effects of cold plantar douche on constipation related symptoms and changing gastric motility in individuals with functional constipation, by using CAS, CSS, PACQOL and EGG. There were 60 subjects in total, 30 subjects in control group and 30 subjects in experimental group. Subjects in experimental group underwent cold plantar douche for 2 min once daily for the duration of 8 days of intervention. They were also advised to consume high fibre diet during the intervention period. The subjects in control group were only advised to consume high fibre diet for 8 days of intervention period. There were no adverse effects reported during and after the intervention period. The results of the individuals who underwent cold plantar douche along with high fibre diet showed decrease in CAS, CSS, PACQOL scorings and increase in postprandial EGG after the treatment and fasting EGG remained unchanged. Those individuals who underwent cold plantar douche along with high fibre diet expressed more satisfaction after the treatment. Whereas, results of the individuals who were advised only high fibre diet also showed slight decrease in CAS, CSS, PACQOL scorings but EGG remained unchanged. Those individuals who were advised only high fibre diet expressed little satisfaction after the intervention period. A study by Khosravam, et al, on the effect of hollyhock leaf compress combined with warm and cold compress on breast engorgement in lactating women showed that, the hollyhock leaf application (here, leaf is considered as a cold compress) reduced the breast engorgement implying parasympathetic activity has come into role. [16] A study done by Zacchi P, et al, showed that an acute stressful cold stimulus (cold pain by hand immersion in cold water) significantly decreased gastroesophageal resistance and gastric tone. However, since both are decreased by cold stress, gastroesophageal function is largely maintained. Nakar Y, et al, found in their study that cold pain stress delayed gastric emptying of liquid but not solid meals. This infers that gastric tone is enhanced with cold application when solid meal is ingested.

When cold douche applied to the plantar region, there is a cutaneous vasoconstrictions of the plantar region as well as the

internal organs which are connected in reflex and that is followed by vasodilatation in cutaneous level as well as in internal organs that are connected in reflex suggesting the increased sympatho-vagal and parasympatho-vagal tones of the internal organs that are connected in reflex with the plantar region.

The results of this study showed that the use of cold plantar douche with high fibre diet has the significant effect ( $p=0.0001$ ) on reducing constipation related symptoms and increasing gastric motility. Parasympathetic nerves from the S<sub>2</sub>, S<sub>3</sub>, and S<sub>4</sub> levels of spinal cord called the splanchnic nerves stimulate the rectum and anal canal to contract or tighten assisting in defecation. The parasympathetic nervous system exerts both excitatory and inhibitory control over gastric and intestinal tone and motility.<sup>[20]</sup> Hence, the probable mechanism of action of the cold plantar douche with high fibre diet indicates the greater improvement in the parasympathetic activity of the gastrointestinal tract. From the results it could be concluded that a cold plantar douche could possibly enhance the gastrointestinal health and it could well be used for the management of gastrointestinal problems.

#### LIMITATIONS OF THE STUDY

There was lack of control over the intake of high fibre diet

#### DIRECTIONS FOR THE FUTURE STUDY

Intervention period can be increased.  
Study can be conducted with a large sample size.

#### VI. CONCLUSION

By observing the results from all measured parameters it can be concluded that, the cold plantar douche with high fibre diet enhances the parasympathetic activity of the gastrointestinal tract. Hence, the use of cold plantar douche with high fibre diet is beneficial in the management of constipation by reducing its severity and improving the gastric motility compared to only high fibre diet.

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