

# **Effectiveness of Tactile Massage using Tensegrity Principle as an Adjunct to Treatment of Constipation: A Randomized Controlled Trial**

**Dr.Kirti B. Chaudhary<sup>1</sup>,Dr.Ujwal L. Gajbe<sup>2</sup>,Dr.Waqar M. Naqvi.<sup>3</sup>,Dr.MahalaquaNazli Khatib<sup>4</sup>**

<sup>1</sup>Assistant Professor, Dept of Anatomy, Jawaharlal Nehru Medical College ,DattaMeghe Institute of Medical Sciences,Wardha;

<sup>2</sup>Professor, Dept of Anatomy, Jawaharlal Nehru Medical College ,DattaMeghe Institute of Medical Sciences,Wardha;

<sup>3</sup>Head of Department,Department of Physiotherapy in Community Health Sciences,R.N.P.C.,DattaMeghe Institute of Medical Sciences,Wardha;

<sup>4</sup>Professor,Department of Physiology, Jawaharlal Nehru Medical College ,DattaMeghe Institute of Medical Sciences,Wardha;

Corresponding author's name and address:

Dr.Kirti B. Chaudhary, Assistant Professor, Dept of Anatomy, J.N.M.C.,Wardha.

Corresponding author's email id:Kirti.kbc@gmail.com

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*E-mail:Email: kirti.kbc@gmail.com,drujwal1970@gmail.com, waqar.naqvi@dmimsu.edu.in, nazli.786@rediffmail.com*

## **Abstract:**

Background: Constipation has become the “bothersome ailments” of the present days. This embarrassing ailment shows negative effects on general well being of patients including physical and mental state, significantly lowers down the capacity of professional work, hinders physical and mental fitness thereby reducing the quality of life.

## **Objectives:**

a) To assess the effectiveness of classical abdominal massage and massage using tensegrity principle as a adjunct therapeutic method for management of constipation.

b) To compare qualitative and quantitative data (ultrasound findings) between two groups.

**Methodology:**Participants will be divided into two groups randomly by coin flip method. Both groups will consists of n participants: First group will receive tensegritymassage and second group will receive classical abdominal massage. Both groups will receive two massage sessions per week for three consecutive weeks. Massage will be performed for consecutive four months. The tensegrity based massage and classical abdominal massage will be done by two different physiotherapists. After completion of all massage sessions i.e. after four months, all three questionnaires will again be filled by the patients and Doppler

ultrasound for inferior mesenteric artery will be done to see for the changes in blood flow of the colon.

**Result:** Massage using tensegrity principle is more effective remedy for constipation. It may have a positive effect on both qualitative and quantitative aspects of bowel movement. It may improve mental and physical well being of these patients thereby, excluding adverse effects of pharmacotherapy.

**Conclusion:** Tensegrity massage is superior to classical abdominal massage for constipation.

## INTRODUCTION:

Constipation has become the “bothersome ailments” of the present days. Constipation is a symptom resulted by a sedentary life style, usually reported by people residing in highly developed countries<sup>1</sup>.

Different individuals relate different meanings to the word constipation. There are various risk factors for constipation like physical inactivity, low caloric intake, low-fiber diet, older age, low income, low educational level, various systemic and gastrointestinal (GI) disorders as well as medications. Constipation affects large number of population and women being affected twice as compared to men<sup>2</sup>. It affects people of different ages<sup>3</sup>. In India the prevalence of constipation is around 22%. This embarrassing ailment shows negative effects on general well being of patients including physical and mental state, significantly lowers down the capacity of professional work, hinders physical and mental fitness thereby reducing the quality of life<sup>4</sup>. As contributors for constipation largely differs from each other, treatment needed to be given for long-duration<sup>5</sup>. Variety of conservative treatment methods are available for constipation, like biofeedback, pharmacotherapy, physical treatments, reflexotherapy, and modification of lifestyle<sup>6</sup>. Also classical massage can be used for people with constipation.

The fascia covers the entire human body. It envelops all the muscles, vessels and visceral organs. It covers almost all organs forming capsule for them and also it sends septa which carries nerves and vessels with it. Thus fascia becomes an organ and it can easily affects the individual health.

Biotensegrity is a principle that describes a structural relationship between each and every part of the organism and relates mechanical system to integrate them into a complete functional unit. It is a concept that represents a shift in biomechanical thinking and brought about the changes in the way we think about the complexities present in functional anatomy.

The present study is an attempt to develop a non invasive procedure like massage as an adjunct treatment for patients of constipation using tensegrity principle. This tensegrity principle was originally explained by Ingber in 1998, Myers modify it on the myofascial level, and worked out by Kassolik & co-authors in massage<sup>7</sup>.

The intrinsic nature of tensegrity massage is to normalize the tension of structurally connected ligaments, fascia and muscles. This therapy involves massaging ligaments, fascia and muscles that are connected structurally with the tissues that are painful or excessively tensed<sup>8</sup>. This mechanism of tensegrity massage explains how it can be used in patients

suffering from constipation. If the tissue tension inside the abdominal cavity be normalized, there can be improvement in functions of the abdominal organs as well as peristaltic movements of colon. This can also normalize the autonomic nervous system, leading to proper actions of muscles of the colon<sup>9</sup>. Available literature has confirmed the relation of massage with autonomic nervous system.

Studies that has been done till now used classical abdominal massage for conservative management of constipation (directly massaging the abdominal layers). The studies reported improvement in patients of constipation. Presently there are no studies comparing classical abdominal massage with massage using tensegrity principle. The massage using tensegrity principle normalize the tension between the organs in the abdominal cavity and bring about proper distribution of lymph flow and venous return in the rectal area.<sup>10</sup> Thus arise a need to develop a strategy which will analyse the value of massage therapy in the abdominal cavity by measuring blood flow using an apparatus i.e. by Doppler ultrasound.

Sr. No.	Study (First author, year)	Aim of the study	Study group	Intervention	Measured Outcome	Outcome
1.	Baran A, Ates S.(2019) <sup>11</sup>	Abdominal massage in management of age related constipation	I=30 C=30	Abdominal massage for 15 minutes for four weeks.	Bristol stool scale	Massage was found effective for the management of constipation.
2.	McClurg et al. (2016) <sup>12</sup>	To reduce the constipation symptoms in Parkinson patients	I=16  C=16	abdominal massage every day for 6 weeks, change of lifestyle.	Gastrointestinal Symptom Rating Scale  Constipation Severity Scale  Neurogenic Bowel Dysfunction  Bowel diary	An abdominal massage is an effective approach.
3.	Turan and Aşt (2016) <sup>13</sup>	Abdominal massage for constipation and the quality of	I=30	Postop 4th day, 2 times a day for 3 days, 15-	Gastrointestinal Symptom Rating scale,	Constipation symptoms decreased and quality

		life in the orthopaedics and traumatology patients		minute abdominal massage	Constipation Severity scale, Bristol Visual Stool scale  The Patient Assessment of Constipation Quality of Life (PAC-QOL) scale,  European Quality of Life scale (EQ-5D)	of life improved.
			C=30	laxative use and lifestyle change		
4.	McClurg et al. (2011) <sup>14</sup>	Abdominal massage for management of constipation in MS patients	I=15  C=15	Abdominal massage for 15 min daily and 4 weeks Change of lifestyle	*Constipation scoring system  *Neurogenic bowel dysfunction  *Bowel diary	The abdominal massage was observed to be an effective method
5.	Lämås et al. (2010) <sup>15</sup>	Abdominal massage on laxative use and gastrointestinal function in the constipated people.	I=30  C=30	Abdominal Massage for 15 minutes 5 days a week and 8 weeks  Laxatives	*Gastrointestinal Symptom * Rating scale	Severity of gastrointestinal symptoms reduced and bowel movements increased.

**OBJECTIVES:**

- a) To assess the effectiveness of classical abdominal massage and massage using tensegrity principle as a adjunct therapeutic method for management of constipation.
- b) To compare qualitative and quantitative data (ultrasound findings) between two groups.

## **METHODS:**

Study design:Randomized reference standard Controlled single blind clinical Trial.

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Locus of the study:R.N.P.C.Kinesiotherapy unit in collaboration with department of Medicine, Surgery and Radiodiagnosis at AVBRH, a teaching hospital of J.N.M.C., Sawangi (Meghe) Wardha.

### **Study setting: Hospital setting.**

Period of study: 3 years.

Sample size:As this is an innovative study and no reference is available, pilot study will be conducted to decide the sample size.

Eligibility criteria

The Inclusion criteria:

Diagnosed patients of constipation of both genders.

Participants will be the patients attending medicine and surgery O.P.D. at Acharya Vinoba Bhave Hospital, Sawangi Meghe, Wardha.

Diagnostic criteria:-Less than three spontaneous bowel movements per week associated with at least two of the these,lumpy or hard stool, straining, feeling of anorectal obstruction,feeling of incomplete defecation, manual approach required to defecate in minimum 25% of defecation attempts.<sup>16</sup>

- age between 20 to 50 years
- patients who have given written informed consent.

The Exclusion criteria:

Diagnosed cases of

- circulatory failure
- respiratory failure
- coronary artery disease; hypertensive patients in crisis;
- liver transplantation patients; acute onset hepatitis ( recent or in history);
- operated patient (exception ;appendicectomy or cholecystectomy more than 5 years ago)
- long duration feeding through parenteral route;
- muscle disorders of genetic origin;
- parasitic infestations of the gastrointestinal tract
- pregnancy; cachexia; mental disorders
- anomalies of the rectum; congenital or acquired
- collagenosis;hemorrhoids
- Spinal injury

- Vertebral injury of lower back

## **METHODOLOGY:**

Prior to the study, the participants will fill the consent form, explained about the confidentiality of the study and will respond to the questionnaire provided as annexures A,B and C. The patient questionnaire reflects both quantitative and qualitative aspects, quantitative being frequency of bowel movements and qualitative being feeling of incomplete evacuation after bowel movements, feeling of pain after bowel movements. This data will be used to evaluate the condition of the patient before starting the massage. Also baseline investigation of Doppler ultrasound for inferior mesenteric artery will be done to see the blood flow of the colon.

Participants will be divided into two groups randomly by coin flip method. Both groups will consists of n participants: First group will receive tensegritymassage and second group will receive classical abdominal massage.

## **INTERVENTIONS:**

Intervention that is going to be done in the study is the massage.

First Group will receive tensegritymassage and Second Group will receive classical abdominalmassage. The massage will be done by the experts i.e.physiotherapist. Physiotherapists will be knowing about the type of massage given to groups but participants will not be given the idea about the type of massage going to be performed on them. Compliance of patients will be maintained by regular reminder phone call and with the help of health workers in that particular area.Massage will be paused with the complaints of the patients like pain or irritation.

Both groups will receive two massage sessions per week for three consecutive weeks. Massage will be performed for consecutive four months.

**First Group:** Patient assume a lying down position. Firstly, brushing of the abdominal skin to be done. After that elastic deformation of the thoracolumbar fascia will be done. Kneading will deform the abdominal integuments. Peristalsis in the vessels will be triggered for carrying away lymph from the pelvic region by circular movements in medial one-third of the thigh, towards the saphenous opening. To facilitate venous blood return from the upper part of the abdominal area, stroking movements will be done towards armpit, along the thoracoepigastric and costoaxillary veins. Lastly intercostal muscles will be deformed in the region of false ribs. The massage session will continue for approximately twenty minutes.

**Second Group:** The patients assume the lying down position. Circular movements to be done on abdominal skin by superficial and deep stroking techniques along the direction of colon. The massage session will continue for approximately ten minutes.

The tensegrity based massage and classical abdominal massage will be done by two different physiotherapists.

After completion of all massage sessions i.e. after four months, all three questionnaires will again be filled by the patients and Doppler ultrasound for inferior mesenteric artery will be done to see for the changes in blood flow of the colon.

### **STATISTICAL ANALYSIS:**

Statistical analysis will be done as per analysis of superiority trial using standard formula. Anonymity and confidentiality will be assured. Data will be kept in a locker, password protected file in office computer and the study investigators will only have access to data.

### **Expected Outcomes/Results:**

Massage using tensegrity principle is more effective remedy for constipation. It may have a positive effect on both qualitative and quantitative aspects of bowel movement.

It may improve mental and physical well being of these patients thereby, excluding adverse effects of pharmacotherapy.

Outcome measures will be collected after completion of all massage sessions i.e. after four months.

Outcome measures will be

### **Primary outcome:**

1. Questionnaires to see for improvement in quality of life reflecting changes in number of bowel movements, reduction in pain sensation, feeling incomplete evacuation after bowel movements.
2. Doppler ultrasound of inferior mesenteric artery for the improvement of blood flow to colon.

Secondary outcome: Any adverse events.

### **DISCUSSION:**

Kassolik et al (2007)<sup>17</sup> used tensegrity based massage in patients with prostatic hyperplasia to alter and normal the distribution of blood of pelvis minoris. This study was done on 42 patients of Benign prostatic hyperplasia. Half of the patients received pharmacotherapy and other half received massage based on tensegrity principle. Tensegrity massage performed through the abdominal integuments and it was markedly accepted by patients and resulted in a subjective improvement in micturition.

Kassolik et al (2013)<sup>18</sup> applied the tensegrity based massage for treating chronic shoulder pain. This study was done on 30 patients of chronic shoulder pain syndrome. One group received classical massage around shoulder joint and other group received massage using tensegrity principle. The tensegrity group showed increase in joint flexibility.

Anna Crowle and Clare Harley (2019)<sup>19</sup> treated pelvic organ prolapse by the use of biotensegrity focused therapy. Twenty three women with complaint of pelvic organ prolapse

including cystocele, urethrocele, cervical descent and rectocele participated in the study. It was a retrospective case series. All patients received tensegrity focused therapy for prolapse. The case series offers preliminary evidence for the association between pelvic organ prolapsed and pelvic tissue tension. The study demonstrated that the symptoms were reduced and in some cases resolved with therapy.

Few more interesting studies on Physical therapy modalities were reported<sup>20-22</sup>. A few studies were reviewed<sup>23-25</sup>. Now different types of treatment modalities are available for patients suffering from constipation. Also various types of massage are there to manage the symptoms of constipation. As massage therapy usually relieves the symptoms without any adverse effects, it can be an adjunct treatment of choice for the patients of constipation. We intend to develop a massage therapy using tensegrity principle to balance and equilibrate the tension between the structurally connected tissues in the patients of constipation without any co-morbidities. This massage therapy not only relieves the symptoms but also the effect will be long lasting as the tissue structure and functions will be tried to bring to normal.

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