

# Application of the Vibration Technique to Relieve Shoulder Pain Post-Surgery

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## Abstract

**Objective:** To determine the effect of the application of vibration on shoulder pain for patients after laparoscopic cholecystectomy. A true experimental design study (a randomized controlled trial) was carried out at Surgical Ward in AL-Kindi Teaching Hospital and Baghdad Teaching Hospital. (70) patients divided into two group: study and control groups to achieve the study objectives. A checklist was developed consisting of two parts: the first part - the demographic characteristics of patients, and the second part - consisting of numerical pain scale (NRS) for patients with shoulder pain after laparoscopic cholecystectomy. The interview method was chosen to collect the data. The results of the data showed that all of the 70 patients with shoulder pain post-LC had a severe pain level in the pre-test, while the results of the post-test of the application were at a statistically significant high level through the application of vibration and exercise, which effectively reduced shoulder pain. Vibration had a positive effect on reducing shoulder pain; vibration played a significant and obvious role in the study group.

**Keywords:** Vibration, Shoulder Pain, Post- Surgery

## Introduction

Laparoscopic cholecystectomy has a lot of positive effects, including faster recovery duration, better surgical vision, minimal trauma, lesser bleeding, and lower rates of infection. It has gained support and approval from both surgeons and patients, and it is now the preferred technique for cholecystectomy <sup>(1,9,11)</sup>. Although laparoscopic cholecystectomy has a proven record of success, some patients suffer severe shoulder pain after the surgical procedure, which has been reported in between 21 and 80% of laparoscopic cholecystectomy incidents <sup>(2,12,13,17)</sup>. The primary cause of shoulder pain following LC is unclear; however, in theory, high-pressure CO<sub>2</sub> insufflation during surgery and gas buildup in the sub-hepatic region may result in the conversion of residual gas into carbonic acid and diaphragmatic acidosis. This irritates the diaphragm and stretches the fibers, stimulating the phrenic nerve, which results in pain in the shoulder tip <sup>(3,10,14,16)</sup>. The first therapy approach is vibration, which is frequently used for massage purposes and applies directly to the shoulder <sup>(4,15,18)</sup>.

**Methodology:** A true experimental design for patient suffer from shoulder pain after LC. The researcher was carried out the study at Surgical Ward in AL-Kindi Teaching Hospital and Baghdad Teaching Hospital. Seventy patients with shoulder pain. The data collection technique used was the interview method. The study sample was divided into two groups. Obtain their permission to participate in the study. The study protocol was reviewed and approved by the Ethics Committee of Baghdad University of collage of nursing. After the patient has performed a laparoscopic cholecystectomy and gone into the surgical ward, waiting to remove anesthesia and showing signs of

patient consciousness. The researcher starts by assessing shoulder pain by using a numeric pain scale before doing the intervention, then gives the patient vibration by using a massage gun vibration device and finally The pain measurement was repeated for 2 days after the intervention. The first part consists of patients' sociodemographic characteristics and after that numerical pain scale to measure shoulder pain after surgery.

## Results:

The study samples (Study and Control Groups) according to the demographic data presented that mean age of the study group was 42.85 years old while the mean age for the control group was 38.2 years old. In relation to gender, most of the study group (60 percent) and of the control group (51.4 percent) were females. The same percent of both the study group and the control group (51.4 percent) have chronic diseases.

Table 1: Description of Pain scale according to Patients' responses after surgery.

Post- Intervention	Groups	Study group	
		F.	%
Study group	No pain	0	0
	Mild Pain	11	31.4
	Moderate Pain	24	68.6
	Severe Pain	0	0
Study group	No pain	0	0
	Mild Pain	0	0

	Moderate Pain	2	5.7
	Severe Pain	33	94.3

F.= frequency, % = percentage, No pain score (0), Mild pain score (1,2,3), Moderate Pain score (4,5,6), Severe Pain Score (7,8,9,10).

Table (1) showed that all participants in the study group have severe pain pre-surgical intervention (cholecystectomy). While about 31.4 percent of the study group have mild pain and 68.6 percent have moderate pain after intervention by vibration which means that the severity of pain was decreased especially after vibration use.

F.= frequency, % = percentage, No pain score (0), Mild pain score (1,2,3), Moderate Pain score (4,5,6), Severe Pain Score (7,8,9,10).

Table (3) showed that all study participants in the control group have severe pain at pretest duration, and approximately the same percent (94.3 percent) have also severe pain at retest duration, which reveals no change in the level of pain without intervention.

## Discussion

Results in table (1.) presented that the mean age of the study group was 42.85 years old, while the mean age of the control group was 38.2 years old the frequency of age groups, the most frequent age group was between 29-38 years old, which was about 11(40%) in the study group, while in the control group, the same frequent age group was about 31.4%. In relation to gender, the results showed that more than half of the study group 60% and 51.4% of the control group were female. The result is supported by the study that was done by Rashid<sup>(5)</sup>, which stated that in Al-Kindi Teaching Hospital, 920 participants underwent laparoscopic cholecystectomy; the mean age of the patients was 40.43 years old; 38 of the participants converted to open surgery; the majority of the sample was female (96.6%); and about 4.1% of individuals had open cholecystectomy. In Isfahan, Iran, the study that done by Hajati<sup>(6)</sup>, which asserted that single-blind randomized controlled trial, total of 64 people participated in this study, Half of the study sample were women. The mean age was 46–48 years, and the study showed that the use of lavender oil decreased the postsurgical STP in patients following LC. Results of table (4.2) showed that all participants in the study group had severe pain prior to surgical intervention (cholecystectomy). A quarter of the study group (31.4%) had mild pain, and more than a third of the study group (68.6%) had moderate pain after intervention by vibration, which means the severity of pain was reduced, especially after using vibration. In Canada, the experimental study supported that the participants in this study were 18, to study the effect of vibration on low back pain when standing for many times, each participant was provided with a Zewa Spa

Buddy vibrating massage belt (53 Hz vibration), using the VAS score to evaluate pain severity. During the 12-minute period, VAS recorded mild pain, a 34% pain reduction in the low back. The results showed that using vibration for 12 minutes reduced the severity of low back pain<sup>(7)</sup>. The study supported by in Michigan, randomized prospective study, 28 participants in the study divided into two groups vibration and control, using NRS score for assess pain level, the study carried out by Eichhorn<sup>(8)</sup>, stated that effect of vibration in reduced pain after surgery, the result showed 45% of patients reported a decrease in pain after vibration (p value < 0.001).

## Conclusions

Vibration had a positive effect on reducing shoulder pain; vibration played a significant and obvious role in the study group.

## Recommendations

The researcher recommended applying the vibration device to all patients suffering from shoulder pain after laparoscopic cholecystectomy.

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