

EFFECTIVENESS OF TRANCUTANEUS ELECTRICAL NERVE STIMULATION ON FROZEN SHOULDER (TENS): LITERATURE REVIEW

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Abstract

Frozen shoulder is shoulder joint pain that occurs at an average age of 40-70 years with a prevalence of 3% of the general population in Indonesia. Transcutaneous Electrical Nerve Stimulation (TENS) is a therapeutic modality using electric current which is able to stimulate the nervous system. This research aims to determine the effectiveness of (TENS) in frozen shoulder sufferers. Literature review research was carried out using PICO search in databases such as Google Scholar. There were 4 journals that met the criteria and showed the results that TENS was carried out twice a week, with a duration of 10-15 minutes and applied in continuous mode for 1 month with a p-value < 0.05 shows a significant effect on reducing pain when carrying out daily activities such as washing clothes, combing hair, and picking up items from high places. So the author can conclude that TENS is effective in reducing pain and can also increase the joint range of motion (ROM) in the shoulder.

Keywords: Frozen Shoulder, TENS

INTRODUCTION

Joint stiffness in the shoulder is known as frozen shoulder. Frozen shoulder, also known as sticky capsulitis, is a common condition affecting adults. According to reports, frozen shoulder occurs in 2% to 5% of the general population and increases to 10% to 38% in people with diabetes and thyroid disease (Maund et al., 2012)

The average age suffering from frozen shoulder, aged 40 years. Frozen shoulder is caused by two factors, primary and secondary (Maharaj, 2021).

The primary cause is still unidentified (idiopathic), while the secondary cause is usually caused by trauma to the glenohumeral joint, glenohumeral surgery, prolonged immobilization, diabetes, thyroid disorders, Dupuytren's disease, and other immune system disorders (Date & Rahman, 2020).

Frozen shoulder often develops as a result of bruising in women who have undergone treatment for minor injuries. As a general rule, the frozen shoulder will experience three distinct

phases: the initial phase of pain, the second phase of stiffness, and the third phase of intensified pain that allows recovery to occur (Badaru, 2020).

Common causes of frozen shoulder are pain and limited motion in the babu joint. Limited scope of motion of the joint in the shoulder can cause difficulty in daily activities, such as combing hair, picking up items in high places, and washing clothes (Tiwari et al., 2015).

Symptoms associated with frozen shoulder are described as dull pain and can reach the biceps. Pain and stiffness may become agitated when touching the hand or when the hand hits the back. According to (Ramirez & Paz Galupo, 2019), the scope of joint motion limitations usually occurs in flexion, abduction, internal rotation, and external.

Physiotherapy is significantly more effective than medical treatment for frozen shoulder. Short Wave Diathermy (SWD), Micro Wave Diathermy (MWD), Infra Red (IR), and Ultrasound (US) are some of the physiotherapy techniques that can be used, along with exercise therapy and Transcutaneous Electrical Nerve Stimulation (TENS) (Hsieh et al., 2021). The main problem in frozen shoulder sufferers is pain and limitation of the Joint Scope of Motion (LGS), which can be treated with TENS, a method that uses electrical energy to stimulate other tubular systems through skin perfusion (Parjoto, 2006). TENS therapy is available to reduce pain/chills so that users can move as before. Physiotherapy programs are useful for reducing pain both press and motion, increasing muscle strength, increasing the scope of motion of joints and restoring functional activities / daily activities (Alptekin et al., 2016).

This study aims to determine the effectiveness of the tens intervention physiotherapy program against frozen shoulder cases.

METHODS

This study used the literature review method, using PICO format search: (P = Population) patients with frozen shoulder, (I = Intervention) Transcutaneous Electrical Nerve Stimulation (TENS), (C = Comparison) no comparison, (O = Outcome) pain reduction and increased joint scope of motion (LGS).

This researcher obtained information based on the Google Scholar database with journals spanning the last 10 years, namely 2013-2023.

With Inclusion criteria; (i) the study subjects are elderly who have a history of frozen shoulder or other conditions related to frozen shoulder with an age range of 40->70 years.

Research articles will be rejected if they have the following exclusion criteria (i) research with systematic review methods, (ii) research journals under 2013, (iii) journals do not discuss the effect of TENS on frozen shoulder. Measurement tools in each study used; Numeric Rating Scale (NRS), Shoulder Pain Disability Index (SPADI), Visual Analogue Scale (VAS), Verbal Descriptor Scale (VDS), and Transcutaneous Electrical Nerve Stimulation (TENS) (Banerjee & Johnson, 2013).

RESULTS AND DISCUSSION

Of the 5 journals studied after passing the screening, eligibility, and inclusion stages. TENS is a modality tool used as a method of pain reduction treatment for frozen shoulder cases (Shaheen et al., 2017).

Table 1. Comparison Experimental Grup dan Control Grup

Reviewer	Participant		Intervention		Measuremen t	Result s	Design Study
	Intervention group	Control group	Experimental group	Control group			
Sabilla et al (2022)	n= 1 52 years	-	TENS	-	SPADI	-	Case Report
(Susilaningsih et al., 2018)	n=1 49 years	-	TENS	-	VDS	-	Case Study
(Aditya, 2023)	n= 10 unknown	n= 10 unknown	TENS	NMT	VAS	P< 0,05	Quasi Experimental
Dwi, N.A. (2018)	n= 7 <30	n= 7 <30 years	TENS and Manipulation Therapy	TENS and Hold Relax	Uji Wilxocon dan Whitney Test	P< 0,05	Quasi Experimental

Based on a literature review study, the authors found that of the 31 sample results the average was dominated by <30-52 years old. Of the many literature found, most literature uses a Quasi Experimental research design with VAS measurement with p < 0.05. Experimental group using TENS intervention while control group using exercise therapy (Favejee & Koes, 2011).

Table 2. Dosis Intervensi TENS

Reviewer	Type Of Intervention	Therapeutic Dosage				Duration Theraphy
		Frequency	Intensity	Type	Time	
Sabilla et al (2022)	Continous	3 times	-	TENS	-	3 times
Endang, S., & Farid, R. (2021)	Continous	2 times a week	200 HZ	TENS	15 minutes	8 times
Aditya, D. P., & Nur, F.D. (2018)	Continous	2 times a week	-	TENS	-	8 times over 4 weeks
Dwi, N.A. (2018)	Continous	2 times a week	10-200 HZ	TENS	10 minutes	8 times for 1 month

Based on the literature review study, the author found that there was a type of intervention on TENS with intermittent with a frequency of 2 times / week, intensity of 100 HZ, with a duration of 10 minutes for 8 times for 1 month.

Table 3. Mean Of Study Characteristic

Reviewer	Measurement	Experimental group		Control group		Significant
		Pre	Post	Pre	Post	
Sabilla et al (2022)	SPADI	46,9	23,8	-	-	unknown

Endang, S., & Farid, R. (2021)	VDS	1,33	3,66	-	-	unknown
Aditya, D. P., & Nur, F.D. (2018)	VAS	6, 53	4, 24	6, 62	5, 74	P<0, 05
Dwi, N.A (2018)	Uji Wilxocon dan Whitney Test	109,2	74,5	125,9	154,5	P<0,05

Based on the table above, when compared with the control group, the intervention group showed a good and significant improvement.

Discussion

In January and February the study was conducted at Rumah Sahabat South Jakarta using a quasi-experimental research design. About 20 sample survey respondents were divided into two groups, 10 control group respondents and 10 intervention group respondents. Researchers gave the intervention team TENS every two days for four days. Data analysis using the Mann-Whitney Test to determine if there is evidence of a negative impact of TENS interventions. The results of the Mann-Whitney test showed that the use of TENS and NMT had a negative influence on the intervention and control groups respectively with a p-value of 0.0001 or $p = 0.05$. (Aditya, 2023).

The study was conducted on frozen shoulder patients at the Polyphysiotherapy Medical Rehabilitation Installation of RSAL Dr. Rameladuring the first calendar month of 2012, namely January-February. The study used a pseudo-experimental design with two groups undergoing before and after tests using the Wilcoxon and Mann Whitney tests. The sample used as a sample amounted to 16 people, but 2 of them dropped out because they were unable to complete the program. So there were 14 subjects who met the eligibility criteria. Where TENS and manipulation therapy were given to Group 1 with LGS results before and after the test determined by $P0.05$. TENS relaxation and hold were applied to group 2 with LGS results increasing by $p = 0.05$, indicating intergroup communication. (Dwi, NA (2018))

The results of research on frozen shoulder treatment conducted at the 52-year-old Independent Physiotherapy Clinic in Patients. This study had only one response to the intervention group, by giving TENS intervention 3 times using SPADI measurements. Current research designs use case reports; The purpose of this design is to understand the prognosis of the case. Using SPADI obtained the following results: 46.9 for post-test and 23.8 for pre-test.

Diagnosis of frozen shoulder in a 49-year-old patient. The treatment offered consists of TENS with a frequency of about twice a month and an intensity of 200 Hz for 15 minutes eight times in a calendar month. Utilizing VDS with post-test results as follows: resting pain: 1, motion pain: 6, tenderness: 4, pre test score results: resting pain: 1, motion pain: 2, tenderness: 1.

CONCLUSION

Frozen shoulder is joint pain in the shoulder due to trauma to the glenohumeral joint which can cause pain and limited functional activity. The results of data synthesis showed that TENS provided a significant effectiveness of $p < 0.05$ in reducing pain and increasing joint scope of motion (LGS). The administration of TENS intervention can also be combined with other therapeutic exercises such as finger walking exercises.

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