

Role of Stretching Exercises on Reducing Neck Pain and Stiffness Following Thyroidectomy

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ABSTRACT

Background: Thyroidectomy, a common surgical procedure for thyroid diseases and carcinoma has major complication of neck pain and stiffness due to patient's hyper extended position during procedure. **Objective:** The main purpose of the study was to find the effectiveness of stretching exercises on decreasing neck pain and maximizing ROM in patients with thyroidectomy. **Study Design:** Randomized Control Trial. **Settings:** Madinah Teaching Hospital and Allied Hospital, Faisalabad Pakistan. **Duration:** 30th December 2018 to 23rd May 2019. **Methods:** This RCT recruited 40 patients that meet inclusion criteria and were randomly divided into two groups. Treatment group performed neck stretching exercises, home exercise plan along with routine care. Control group only received routine care. Primary outcomes were neck pain recorded by Numeric Pain Rating Scale (NPRS) and neck range of motion (ROMs) measured by Universal Goniometry. Secondary outcome of study was neck stiffness measured by Copenhagen Neck Functional Disability Scale (CNFDS). Statistical analysis was done through SPSS version 20. **Results:** Results shows neck pain was significantly reduced in treatment group after 1 week of discharge. There was significant difference in cervical ROMs (neck flexion, neck extension, neck flexion, neck right rotation, left and right-side flexion) between both groups. Mean CNFDS score 1 week after discharge in treatment group was significantly lower than the control group with p value=0.00. All three parameters in treatment group at 1 week after discharge shows pronounced improvement. **Conclusion:** Combination of guided neck stretching exercise program during hospital stay and a comprehensive well understood home exercise plan followed by patients undergoing thyroidectomy, proved to be beneficial in terms of neck pain, neck ROM and neck stiffness.

Keywords: Stretching exercises, Neck pain, Neck stiffness, Thyroidectomy.

INTRODUCTION

In Pakistan papillary thyroid carcinoma is the most prevalent thyroid malignancy ranging from 69-71%.¹ Thyroid diseases are more common in females (63.33%) than males (36.67%).² The removal of part or all of the thyroid gland is called Thyroidectomy.³ In patients suffering from thyroid diseases such as simple goiter, benign thyroid tumors, and hyperthyroidism, thyroidectomy is preferable treatment option. Advantage of using total thyroidectomy is that it eradicates the risk of recurrence.⁴ Mean operating time for conventional thyroidectomy is 99.8 ± 19.5 minutes.⁵ The primary and

most complications following a thyroidectomy are reported to have laryngeal nerve palsy and hypothyroidism.⁶ Neck pain and neck stiffness was also outlined by most of the patients.⁷ During the procedure the patient's neck is kept in hyperextension position. About 80% of patients complaint of occipital headache, pain and discomfort in the posterior neck region following surgery. Prolonged extended position intra-operatively releases neural transmission and nociceptive stimuli which causes posterior neck pain. Muscle sprain, muscle ischemia and hyper extended position of cervical facet joints also contribute to neck pain.⁸ Symptoms are

more severe in patients who do not move their head and neck postoperatively.⁹ Patients complain about neck stiffness not because of pain at the site of incision but because of neck position during the surgery.¹⁰ After thyroidectomy patients experience problems with neck movement and do not move their necks and walk like robots probably to stop aggravation of neck pain and to protect their incisions. Neck movements are restricted due to stiffness, which causes neck pain.¹¹ Neck active ranges of motion are also reduced due to positioning of neck during the surgical procedure and neck posture maintained by the patients after surgery.¹²

Variety of treatment options is available for reducing pain and improving functionality after several surgical operations. Stretching Exercises are one of most effective treatments.¹³ Stretching aims at improving joint range of motion, relieving muscle pain, decreasing muscle tension and improving circulation. Combination of stretching and yoga is also performed.¹⁴ Neck stretching exercises include basic neck movements, which are simple and most effective exercises.³ Static stretching for 30-60 seconds is considered the safest type of stretching. Care must be taken to ensure that restricted structures are stretched properly and adjacent structures are not over stretched.¹⁵

A randomized control trial was conducted at Assuit University Hospital in order to evaluate the efficacy of teaching stretching exercises to patients on reducing neck pain and disability after thyroidectomy. Stretching exercises were taught to stretching group while routine care was given to control group. This study shows that 1 week after thyroidectomy stretching exercises reduce neck pain and related disability in study group in contrast to control group. In study group more than half (56.7%) of patients had no neck disability.¹⁶

In order to evaluate the efficacy of stretching exercises to treat neck pain and disability after total thyroidectomy a randomized control trial was executed between May 15, 2013 and June 30, 2014. Stretching and control groups were assigned to participants. It was reported that stretching group experienced significantly less pain and disability as compared to control group. Neck pain with movement was markedly reduced in stretching group as compared to control group. At the end of 1st week mean Neck Pain and Disability Score was significantly lowered in stretching group (8.82 ± 12.23) in comparison with control group (30.28 ± 12.29). There was statistically significant difference between two groups ($p < 0.05$).¹²

There is less awareness about this condition and its exercise program in our clinical setting. Literature conducted on this condition is also limited. Therefore, the aim and rationale of this study was to find the efficacy of stretching exercises on decreasing neck pain and

maximizing ROM among the patients following thyroidectomy. This trial will help physiotherapist to make better treatment plan for the patients undergoing thyroidectomy.

METHODS

This was Randomized Control Trial (RCT) conducted at MTH (Madinah Teaching Hospital Faisalabad) and Allied Hospital Faisalabad. The duration of the study was 5 months from 30th December 2018 to 23rd May 2019.

40 patients were screened from study settings on the basis of selection criteria. Inclusion criterion was fulfilled by 32 patients. Simple convenient sampling technique was used.

Patients following thyroidectomy, both genders, aged 20-70 years were included in the study

Patients following thyroid lobectomy, recent history of spinal surgery, cervical trauma, diagnosed osteoporosis, smoking and diagnosed psychiatric illness were excluded from the study.

Participants were divided into two groups group 1 and group 2. Written and verbal consent was taken from the participants. Once above-mentioned inclusion and exclusion criteria were fulfilled, potential participants were considered. They were requested to participate in the study. Written informed consent was taken from each participant. Each participant was requested to draw a card from box, box was filled with 32 cards among which 16 cards were marked with number 1 and 16 cards were marked with number 2. Participants who draw card with number 1 were placed in experimental group and the participants who draw card with number 2 were placed in control group.

Experimental group performed neck stretching exercises along with routine care while control group only received routine care. Primary outcome measures pain recorded by Numeric Pain Rating Scale (NPRS) and neck ROM measured by Universal Goniometry. Secondary outcome of study was neck stiffness measured by Copenhagen Neck Functional Disability Scale (CNFDS). Pain score was calculated at baseline, post-operative day 1, 2 and 3, at the time of discharge and 1 week after discharge. Cervical range of motions was measured at baseline, at the time of discharge and 1 week after discharge. CNFDS was recorded at baseline and 1 week after discharge.

EXERCISE PLAN

Control Group: Received routine care (nursing care) including daily wound dressing and pain killers/injections.

Experimental Group: Along with routine care, experimental group also received following stretching protocol:

Warm Up: Active assisted Range of motion (AAROMS) all neck movements including neck flexion, neck extension, neck side flexion and neck rotation (3×10). Static Stretching: Static stretching is safest form of stretching as it causes less trauma. 2 repetitions with 15 seconds static stretch were applied to the patients by therapists.¹⁵ Cool Down: Active assisted Range of motion (AAROMS) all neck movements (3×10). Target restricted movements according to patients.

Home plan: A comprehensive well understood home exercise plan was guided to the patients after discharge till one week. After one week follow up was taken. Patients were instructed to perform 5 repetitions of each stretching exercises with 15 seconds hold, 3 times per day (morning, afternoon and evening).⁹ Leaflets were given to patients for home program (Figure-1)

Figure 1: Home plan flyer card showing general range of motion exercises for neck

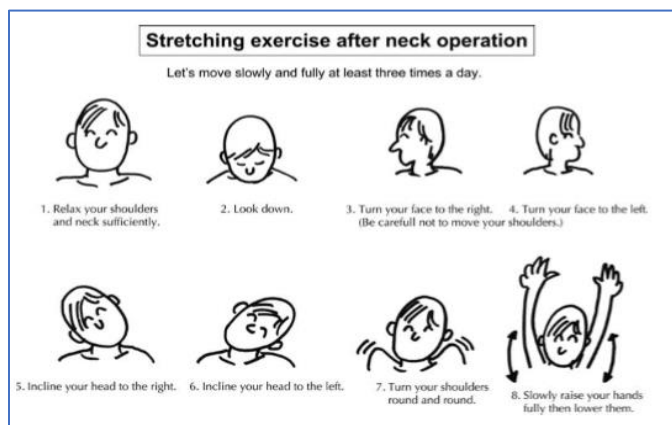
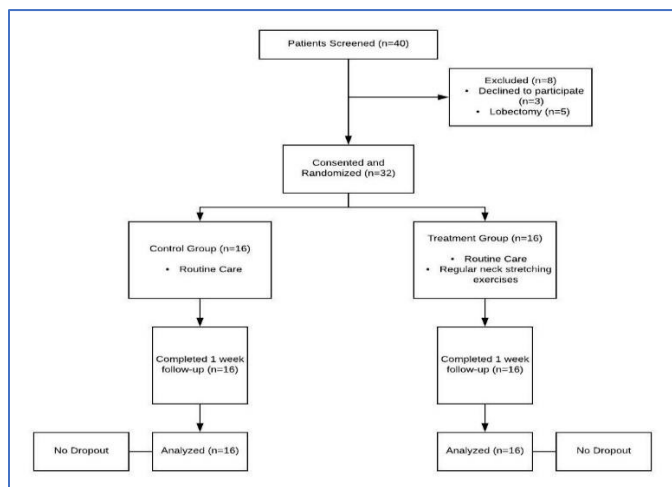


Figure 2: Consort flow sheet



Statistical Package Social Sciences software (SPSS) version 20 was used to analyze the data using statistical

significance $p=0.05$. Independent sample T-test was used to find the difference between two groups.

RESULTS

32 patients completed study protocol. The mean age of the participants was 40.09 ± 12.145 .

Gender wise distribution shows that 2 males (12.5%) and 14 females (87.5%) were recruited in treatment group while 3 males (18.75%) and 13 females (81.25%) were included in control group (Table 1)

At baseline both groups shows moderate pain on numeric pain reading scale. Average pain level was markedly reduced in treatment group in every session. At last session pain was significantly reduced in treatment group as compared to control group ($p<0.05$) (Table 2)

All cervical ROMS were markedly increased in treatment group (Table 3)

At baseline both groups show moderate to severe neck disability on Copenhagen Neck Functional Disability Scale (Mean value for TG=22.81, Mean value for CG=22.56). However, disability score was significantly reduced in treatment group with mean value=8.63 and p -value=0.000 which indicates that neck function was enhanced in treatment group (Table 4)

Table 1: Demographic data of patients

Parameter	Treatment Group			Control Group		
	Maximum	Minimum	Mean (S.D)	Maximum	Minimum	Mean (S.D)
Age (Years)	22	70	39.56 (11.87)	20	65	40.63 (12.78)
Gender (n)	Male		Female	Male		Female
	2		14	3		13

This table shows that female ratio was higher than male ratio.

Table 2: Comparison of numeric pain rating scale score between groups

Session	Group	NPRS Value (Mean ± SD)	P-Value
At Baseline	TG	5.13 (2.156)	0.44
	CG	5.69 (1.922)	
At Post-op Day 1	TG	7.31 (1.580)	0.72
	CG	7.50 (1.414)	
At Post-op Day 2	TG	6.88 (1.455)	0.11
	CG	8.13 (1.147)	
At Post-op Day 3	TG	6.44 (1.153)	0.20
	CG	7.56 (1.143)	
At The Time of Discharge	TG	5.00 (0.730)	0.00
	CG	6.69 (1.138)	
At 1 Week After Discharge	TG	2.81 (0.834)	0.00
	CG	4.69 (1.352)	

*TG: Treatment Group, CG: Control Group

This table shows that p value at baseline was 0.442 while p value 1 week after discharge was 0.00 which is less than selected value(p=0.05), which means that there is

statistically significant difference between Treatment and Control group.

Table 3: Comparison of cervical ROMs between groups

Cervical Movement	Group	At Baseline ROM (Degree) Mean ± SD	P-value	At Discharge ROM (Degree) Mean ± SD	P-value	1 Week After Discharge ROM (Degree) Mean ± SD	P-value
Neck Flexion	TG	20.0 (10.405)	0.46	29.19 (7.670)	0.508	40.81 (5.753)	0.03
	CG	22.75 (10.705)		27.00 (10.589)		33.94 (11.08)	
Neck Extension	TG	21.56 (6.439)	0.66	34.44 (8.140)	0.041	50.56 (4.926)	0.00
	CG	23.0 (11.668)		27.56 (10.01)		34.06 (8.465)	
Neck Rt.Rotation	TG	51.25 (12.003)	0.12	64.00 (9.967)	0.502	77.63 (5.943)	0.00
	CG	47.34 (9.507)		61.69 (9.250)		67.75 (7.095)	
Neck Lt.Rotation	TG	47.25 (11.133)	0.008	62.19 (10.778)	0.806	78.88 (5.365)	0.01
	CG	59.19 (12.448)		63.19 (11.99)		70.69 (11.72)	
Neck Rt.Lateral Rotation	TG	22.13 (8.801)	0.84	31.44 (5.831)	0.079	42.19 (3.799)	0.00
	CG	21.44 (11.123)		26.38 (9.507)		32.81 (9.600)	
Neck Lt.Lateral Rotation	TG	19.19 (7.148)	0.29	31.25 (6.914)	0.338	43.06 (3.623)	0.00
	CG	23.00 (12.204)		28.13 (10.831)		34.56 (10.09)	

*TG: Treatment Group, CG: Control Group

This table shows that after 1 week of discharge p value of cervical ROMS was less than selected value (p=0.05) so there is statistical difference between treatment and control group.

Table 4: Comparison of Copenhagen neck functional disability scale score between groups

Session	Group	CNFDS Scoring (Mean ± SD)	P-value
At Baseline	TG	22.81 (5.730)	0.89
	CG	22.56 (4.858)	
At 1 Week After Discharge	TG	8.63 (3.981)	0.00
	CG	15.63 (5.227)	

*TG: Treatment Group, CG: Control Group

This table shows that at baseline p value of CNFDS was 0.895 while after 1 week of discharge p value was 0.00 which is less than selected value (p=0.05)

DISCUSSION

This study was designed to explore the effects of neck stretching exercises on alleviating neck pain and neck stiffness after thyroidectomy. Neck pain and stiffness is caused by prolonged hyperextension position of neck during surgical procedure and immobility of neck post operatively. Results of this study shows that performing neck stretching exercises after thyroidectomy is beneficial in relieving neck pain and stiffness. It also improves neck range of motions and function.

Current study shows that mean age of the participant undergoing thyroidectomy in control group was 40.63 ± 12.78 and in treatment group was 39.56 ± 11.87 years. Previous study also concluded that ratio of thyroidectomy was more prominent in Middle age.¹⁷

According to current study rate of thyroidectomy in females was higher than the males. Percentage of females in this study was 64.38% and percentage of male was 15.63%. Baloch, et al. (2019) also find the similar results in their study which showed that the ratio of thyroidectomy was higher in females (78.45%) as compared to males (21.54%).¹⁸

The current study reveals that neck pain score was higher on post-operative day 1 in both groups (p=0.72). After one week of performing stretching exercises neck pain was significantly reduced in treatment group (p=0.00). In previous randomized controlled trials Neck Pain and Disability Scale (NPDS) was used to assess post operative neck pain. Results reveal that patients in stretching exercise group experiences less pain as compared to control group with p value<0.05. Mean value of NPDS in stretching group was 8.82 and 30.28 in control group.¹²

The results of this study indicated marked improvement in all neck range of movements in the treatment group after 1week of discharge with p value 0.00. Most of the previous literature conducted on neck stretching exercises following thyroidectomy lacks the measurement of cervical range of motions. Previously study was conducted to compare the effectiveness of neck stretching exercises and kinesio taping for improving neck discomfort after thyroidectomy. Results reveal statistical significant difference between groups (p<0.05), neck ROMs were markedly improved among patients who performed neck stretching exercises.¹⁹

Current study shows significant reduction in CNFDS score in the treatment group (p=0.00) which manifest that neck function was improved in treatment group. A study

was conducted to find the virtue of teaching neck stretching exercises to patients undergoing thyroidectomy. Neck Disability Index (NDI) was used to measure neck disability. Results show that more than half of patients in stretching group reported no neck disability ($p < 0.05$).¹⁶

CONCLUSION

Current study shows that stretching exercises are significantly effective in reducing neck pain, improving neck range of motions and stiffness following thyroidectomy.

LIMITATIONS

Our study had several limitations including a reduced sample size due to dropping out of the patients during screening procedure. Secondly overall time duration of the study was short. Although the trial was brief in duration but favorable results obtained during this short period suggest that treatment protocol would be effective if continued for longer period of time.

SUGGESTIONS / RECOMMENDATIONS

It would be worthwhile to study this protocol with longer duration of intervention and large sample size. Stretching exercises should be included in the post operative treatment protocol for the patients following thyroidectomy.

CONFLICT OF INTEREST / DISCLOSURE

There are no conflict of interest to declare.

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REFERENCES

1. Khan MA, Khan KH, Shah SA, Mir KA, Khattak M, Shahzad MF. Risk factors associated with thyroid carcinoma in North Pakistan. *Asian Pacific Journal of Cancer Prevention*. 2016;17(1):377-80.
2. Hariadha E, Sulaiman SA, Gillani SW, Baig MA. A preliminary study on post-surgical complications after thyroidectomy in Pulau Pinang, Malaysia. *International Journal of Pharmacy & Life Sciences*. 2013;4:2717-21.
3. Atasayar S, Guler Demir S. Determination of the Problems Experienced by Patients Post-Thyroidectomy. *Clinical nursing research*. 2019 Jun;28(5):615-35.

4. Aithal AP, Kumar N, Guru A, et al. Safety and Effectiveness of Total Thyroidectomy and Its Comparison with Subtotal Thyroidectomy and Other Thyroid Surgeries: A Systematic Review. *Journal of Thyroid Research*. 2016;2016(1):1-6.
5. Kim SK, Kang SY, Youn HJ, Jung SH. Comparison of conventional thyroidectomy and endoscopic thyroidectomy via axillo-bilateral breast approach in papillary thyroid carcinoma patients. *Surgical endoscopy*. 2016 Aug;30(8):3419-25.
6. Lifante JC, Payet C, Ménégau F, et al. Can we consider immediate complications after thyroidectomy as a quality metric of operation?. *Surgery*. 2017;161(1):156-65.
7. Ha TK, Kim DW, Park HK, et al. Comparison of postoperative neck pain and discomfort, swallowing difficulty and voice change after conventional open, endoscopic, and robotic thyroidectomy: a single-center cohort study. *Frontiers in endocrinology*. 2018;9:416..
8. Park C, Choi JB, Lee YS, et al. The effect of intra-operative transcutaneous electrical nerve stimulation on posterior neck pain following thyroidectomy. *Anaesthesia*. 2015;70(4):434-9.
9. Genc A, Çelik SU, Genc V, ÖZTUNA D, Tur BS. The effects of cervical kinesiotaping on neck pain, range of motion, and disability in patients following thyroidectomy: a randomized, double-blind, sham-controlled clinical trial. *Turkish journal of medical sciences*. 2019 Aug 8;49(4):1185-91.
10. Lang BH, Ng SH, Wong KP. Pain and surgical outcomes with and without neck extension in standard open thyroidectomy: A prospective randomized trial. *Head & neck*. 2015 Mar;37(3):407-12.
11. Rodríguez-Torres J, López-López L, Cabrera-Martos I, Torres-Sánchez I, Ortiz-Rubio A, Valenza MC. Musculoskeletal neck disorders in thyroid cancer patients after thyroidectomy. *European journal of cancer care*. 2019;28(4):e13053.
12. Ayhan H, Tastan S, Iyigün E, Oztürk E, Yildiz R, Görgülü S. The effectiveness of neck stretching exercises following total thyroidectomy on reducing neck pain and disability: a randomized controlled trial. *Worldviews on Evidence-Based Nursing*. 2016;13(3):224-31.
13. Wilson DJ. Exercise for the patient after breast cancer surgery. *In Seminars in oncology nursing* 2017 Feb 1 (Vol. 33, No. 1, pp. 98-105). WB Saunders.
14. Nakamura K, Kodama T, Mukaino Y. Effects of active individual muscle stretching on muscle function. *Journal of physical therapy science*. 2014;26(3):341-4.
15. Kisner C, Colby LA, Borstad J. *Therapeutic exercise: Foundations and techniques*. Fa Davis; 7th Edition, 2017:100-1.
16. Abd-El Mohsen SA, Ahmed NM. Effect of teaching patients neck stretching exercises on neck pain and disability following thyroidectomy. *Journal of Nursing Education and Practice*. 2018;8(1).
17. El-Khateeb AI, Ali HA, Makhlof GA, Rizk MA. Total extracapsular thyroidectomy versus subtotal thyroidectomy in nonmalignant goiter. *The Egyptian Journal of Surgery*. 2015;34(3):166.
18. Baloch N, Taj S, Anwer M, Naseem M. Frequency of hypocalcaemia following total thyroidectomy. *Pakistan journal of medical sciences*. 2019 Jan;35(1):262.
19. Nagib S, Karkousha R, Nahas E. Effect of stretching exercises vs. Kinesio Taping on postoperative neck discomfort following total thyroidectomy in postmenopausal women. *Physiotherapy Quarterly*. 2019;27(4):21-5.