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CASE REPORT

Effect of cranial base release and swallowing exercises in rehabilitation of post-operative total thyroidectomy patient: a case report

Efecto de la liberación de la base craneal y los ejercicios de deglución en la rehabilitación del paciente postoperado de tiroidectomía total: informe de un caso

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ABSTRACT

Thyroidectomy is a widely practiced surgical intervention with low mortality and morbidity rates; however, it can result in long-term complications impacting health and social well-being. Early physical rehabilitation programs have been shown to effectively address issues such as swallowing difficulties and motor function impairment in the neck and shoulders, thereby improving the overall quality of life for patients. This study aimed to assess the impact of cranial base release in conjunction with swallowing exercises on the post-surgery recovery of patients undergoing total thyroidectomy. A 29-year-old male patient presented with swelling on the left side of the neck, along with pain during neck movements, speech difficulties, and swallowing issues. The patient's neck range of motion, swallowing impairment score, and neck pain and disability scale were measured both before and after treatment. The patient underwent a six-week rehabilitation program consisting of cranial base release, swallowing exercises, and conventional physiotherapy sessions twice daily. The combined approach of cranial base release and swallowing exercises resulted in significant improvements in neck range of motion, swallowing impairment score, and neck pain and disability scale for patients following total thyroidectomy. This study highlights the beneficial effects of integrating cranial base release with swallowing exercises in the rehabilitation of post-operative total thyroidectomy patient, offering promising outcomes for their recovery.

Keywords: Thyroidectomy; Cranial Base Release; Swallowing Exercises; Rehabilitation; Post-Operative.

RESUMEN

La tiroidectomía es una intervención quirúrgica ampliamente practicada con bajas tasas de mortalidad y morbilidad; sin embargo, puede dar lugar a complicaciones a largo plazo que repercuten en la salud y el bienestar social. Se ha demostrado que los programas de rehabilitación física temprana abordan eficazmente problemas como las dificultades para tragar y el deterioro de la función motora en el cuello y los hombros, mejorando así la calidad de vida general de los pacientes. Este estudio tenía como objetivo evaluar el impacto de la liberación de la base craneal junto con ejercicios de deglución en la recuperación postoperatoria de pacientes sometidos a tiroidectomía total. Un paciente varón de 29 años de edad presentó inflamación en el lado izquierdo del cuello, junto con dolor durante los movimientos del cuello, dificultades para hablar y

problemas para tragar. Se midieron la amplitud de movimiento del cuello del paciente, la puntuación del deterioro de la deglución y la escala de dolor y discapacidad del cuello antes y después del tratamiento. El paciente se sometió a un programa de rehabilitación de seis semanas consistente en liberación de la base craneal, ejercicios de deglución y sesiones de fisioterapia convencional dos veces al día. El enfoque combinado de liberación de la base craneal y ejercicios de deglución produjo mejoras significativas en la amplitud de movimiento del cuello, la puntuación del deterioro de la deglución y la escala de dolor y discapacidad del cuello en pacientes tras una tiroidectomía total. Este estudio destaca los efectos beneficiosos de integrar la liberación de la base craneal con ejercicios de deglución en la rehabilitación del paciente postoperado de tiroidectomía total, ofreciendo resultados prometedores para su recuperación.

Palabras clave: Tiroidectomía; Liberación de la Base Craneal; Ejercicios de Deglución; Rehabilitación; Postoperatorio.

INTRODUCTION

Thyroid-related disorders are one of the main abnormalities of the endocrine system that are prevailing in today's scenario worldwide. Currently, a complete thyroidectomy is the recommended procedure for therapy for numerous thyroid conditions. Post-operative side effects are experienced most frequently such as Hemostasis, recurrent laryngeal nerve damage, hypocalcemia, and long-term stiffness in the neck's range of motion.[1] The prevalence of thyroid conditions in National Family Health Survey IV [NFHS IV (2015–2016)] was 2,2 %, while it was 2,9 % in NFHS-V (2019–2021).[2]

The thyroid is mainly responsible for metabolism. Thyroid cancer is one of the most common endocrine neoplasms. According to Cancer Survivors Association [3] It has been explained that there is a complex network of channels in the head and neck that connects the deeper and superficial lymph nodes in the cervical region. Moreover, chronic neck vein cellulitis can cause additional harm to the lymphatic system and can lead to fibrosis.[4]

There are significant medical problems and social problems because of several long-term postoperative complications.[5] Challenges include experiencing pain and restricted range of motion in the neck and shoulders, stiffness, discomfort, and difficulty with swallowing.[5] Restrictions on daily activity and social participation may result from these problems.[5] Mental health is also affected drastically post-surgery.[5] Based on scientific data, rehabilitation therapy for those with persistent medical conditions needs to be accessible to everyone., and respectful of patient independence, according to the World Health Organization (WHO). [5] The shoulder joint can sustain damage from intense movement that can injure the bone, muscle, tendon, ligament, and bursa because of its wide range of motion.[6] Implementing physical exercise as soon as feasible following a complete thyroidectomy is one method of rehabilitation for such patients which helps in fast recovery of patients.[6]

Patients with thyroid cancer may benefit from pharmaceutical management, physical therapy management, or surgical management as treatment options.[7] The standard therapy for thyroid cancer was thyroidectomy, which involved surgically removing the entire thyroid gland.[8] The majority of the research reported that musculoskeletal issues associated with the neck dissection treatment are related to neck and shoulder deformity. [9] About 40 % of participants have adhesive capsulitis, a painful neck range of motion.[9] Thyroidectomy is the main surgical treatment that is currently being considered.[10] Numerous problems followed surgery, for which there is currently relatively little published research. Therefore, further research is required for receiving evidence-based treatment.

CASE REPORT

In the second week of July 2023, a 29-year-old male from Jaipur sought medical attention at Jaipur National University (JNU) Hospital. Upon initial assessment, he reported a five-year-old lump on the left side of his neck, accompanied by systemic illness. Following an evaluation in the outpatient department (OPD) by a physician, it was determined that he had multiple enlarged nodules on the left side near his thyroid gland. History revealed that the lump was uncomfortable and exhibited movement during swallowing, with irregular boundaries. Over the past eight months, the swelling appeared to have increased in size, and he displayed symptoms of hyperthyroidism. There were no indications of hoarseness, dysphagia, or dyspnea before surgery.

Following admission to the ENT ward, a comprehensive series of laboratory tests were conducted, including a complete blood count (CBC), liver and kidney function tests (LFT/RFT), fine-needle aspiration cytology (FNAC), contrast-enhanced computed tomography (CECT) of the neck, and a chest X-ray. Additional investigatory procedures such as ultrasonography (USG), FNAC, and laryngoscopy were also performed. The USG reports indicated enlarged lymph nodes, while FNAC revealed non-specific lymphadenitis. Before surgery, further examination revealed several 1x1 cm swellings in the neck, with a rough surface palpated in clusters at the C-5

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level. The borders were distinctly clear, and the skin colour matched that of the surrounding skin. No discharging sinus or fistula was observed. A delicate, movable scar mark was present on the swollen surface. The chest X-ray showed no cardiomegaly; however, both lungs exhibited decreased air entry, and a mass in the Colli area appeared to be exerting pressure on the trachea. The thyroid displayed masses without microcalcifications, as confirmed by both CT scan and FNAC examination.

Following confirmation of left cervical supraclavicular lymphadenopathy and left-sided thyroid lobe swelling, the patient's provisional diagnosis was established. Subsequently, a plan for excision was formulated, leading to the performance of total thyroidectomy with bilateral neck dissection. Post-surgery, the patient experienced neck pain, coughing, wheezing sounds, difficulty swallowing and speaking, and limited range of motion in the neck and shoulder. Consequently, on postoperative day 4 (POD4), he was referred for physiotherapy treatment (figure 1).

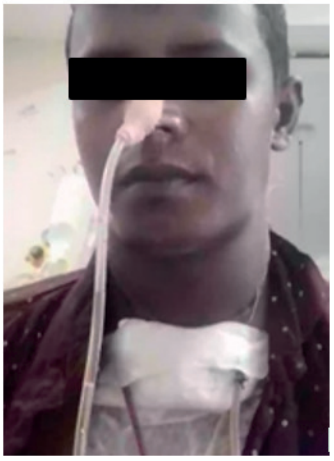

Figure 1. No active lateral rotation

Clinical impression

Following the assessment, interventions detailed in table 1 were initiated. Data were collected both before and after the intervention, marking the commencement and conclusion of the 42-day treatment duration.

The patient initially presented with significant limitations in neck and shoulder range of motion, with a neck Manual Muscle Test (MMT) score of 3+ for lateral rotation, flexion, and extension, and a shoulder MMT score of 3+ for adduction and abduction, and 4 for flexion, 3+ for extension bilaterally. Notably, lateral rotation of the neck was notably impaired. Following a comprehensive physiotherapeutic assessment, it was determined that addressing neck range of motion, swallowing difficulties, and pulmonary complications would be the primary focus of treatment. As such, outcome measures including neck inclinometer ranges, swallowing impairment score, neck discomfort, and disability scale were employed.

Table 1. Rehabilitation regimen for post-operative total thyroidectomy patient

Intervention	Therapist Position	Position of the patient	Procedure	Intensity
Cranial base release [13]	Standing beside the patient	The patient was supine lying	Stroking the posterior cervical musculature with both hands along with the vertical release of the cranial base by giving traction at the end of the procedure.	10 minutes for each step (two sessions a day for six weeks)
McNeill dysphagia therapy program (MDTP) (oral preparatory exercises, supraglottic swallow exercises, Mendelsohn maneuver, Effortful swallow exercises, tongue hold swallow exercises, and head lift exercise) [14]	Standing beside and in front of the patient	The patient was supine lying and sitting for different exercises in this program	Mainly six exercises were performed by the patient which were used as an intervention procedure.	10 repetitions of each exercise (two sessions a day for six weeks)

Cervical range of motion exercise- active assisted range of motion: 0-6 days Active range of motion: 7-14 days Resisted range of motion: 15-42 days [15]	Standing beside and in front of the patient	The patient was in a sitting position or high sitting position.	In the sitting position exercises are performed initially assisted, then active, and gradually resisted.	10 repetitions for each exercise (two sessions a day for six weeks)
Breathing exercises (deep breathing exercises, paper blowing exercises, Thoracic expansion exercises) [16]	Standing beside and in front of the patient	The patient was in a high and long sitting position.	In high and long sitting breathing exercises were performed.	10 repetitions for each step (two sessions a day for six weeks)

Intervention

A tailored rehabilitation regimen outlined in Table 1 was implemented, incorporating cranial base release (figure 2), the McNeill dysphagia therapy program (MDTP) encompassing oral preparatory exercises, supraglottic swallow exercises, Mendelsohn maneuver, Effortful swallow exercises, tongue hold swallow exercises, and head lift exercise, as well as Cervical Range of Motion (ROM) exercises progressing from Active Assisted Range of Motion (AAROM) in the initial 0-6 days, Active Range of Motion (AROM) (figure 3) from 7-14 days to Resisted Range of Motion (RROM) from 15-42 days. Additionally, breathing exercises such as deep breathing exercises, paper blowing exercises, and Thoracic expansion exercises were incorporated into the regimen.

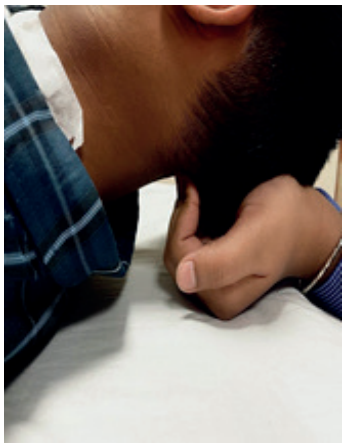

Figure 2. Cranial base release

Figure 3. Active lateral rotation

Following the 6-week intervention period, post-intervention data readings were obtained, revealing improvements in neck and shoulder range of motion, alongside minimal swallowing difficulty as detailed in table 2. These findings signify a noteworthy enhancement in the patient's autonomy and ability to perform daily tasks independently.

Table 2. Pre-treatment and post-treatment outcome measures

Outcome Measures	Pre- Score	Post-Score
Neck inclinometer ranges (17)		
Flexion	20^0	32^0
Extension	10^0	35^0
Lateral flexion		
Right	5^0	32^0
Left	3^0	29^0
Rotation		
Right	8^0	41^0
Left.	6^0	38^0
Swallowing impairment score(18)	18	08
Neck pain and disability scale(19)	81	22

DISCUSSION

The objective of this study was to evaluate the effectiveness of adding CBR to swallowing exercises in the post-operative rehabilitation of total thyroidectomy patients. The study observed notable improvements in post-treatment outcomes compared to pre-treatment values, highlighting the efficacy of the intervention.

The inclusion of CBR alongside swallowing exercises led to significant enhancements in various outcome measures, including neck and shoulder range of motion, as well as swallowing difficulty. This indicates that the combined approach was effective in addressing the specific rehabilitation needs of total thyroidectomy patients, particularly in improving physical function and swallowing function.

These findings are consistent with existing evidence suggesting the beneficial effects of physical rehabilitation interventions in post-thyroidectomy patients. Early initiation of physiotherapy and targeted exercises have been shown to improve swallowing function, reduce neck pain, and enhance the overall quality of life in this patient population. The study's results underscore the importance of a comprehensive rehabilitation approach that incorporates both traditional exercises and specialized techniques like CBR. By addressing multiple facets of recovery, including musculoskeletal function and swallowing function, such interventions can optimize patient outcomes and facilitate a smoother transition to post-operative recovery.

According to Kazi et al.[11], common symptoms following thyroidectomy include painful neck range of motion and recurrent nerve palsy. Non-invasive, conservative therapeutic options such as exercises for rehabilitation, CBR, and swallowing exercises, along with other physiotherapy treatments, have shown promise in reducing post-surgery issues for patients. These combined interventions represent a unique approach that warrants further investigation to better understand their effectiveness and potential benefits for thyroidectomy patients.

Several studies proposed neck stretching exercises as a means to enhance flexibility and neuromuscular coordination, alleviate soreness and muscle weakness, promote physical activity, and encourage proper posture. Their recommendation highlights the potential benefits of incorporating neck stretching exercises into rehabilitation programs following total thyroidectomy. [12,13,14,15]

Widyanti Soewoto et al. highlighted that multinodular goiter can significantly impair lung airflow and restrict the range of motion in the neck, shoulder, and chest. Consequently, they emphasized the importance of taking extra precautions to minimize complications. Thyroidectomy emerged as one of the most efficacious and widely accepted medical interventions for goiter management, according to their findings. [10,16,17,18,19] Further research may be warranted to explore the long-term effects of combined rehabilitation approaches and to identify the most effective strategies for improving functional outcomes in total thyroidectomy patients.

CONCLUSION

In conclusion, the customized physical therapy rehabilitation interventions effectively relieved the patient's primary symptoms, resulting in improved neck and shoulder range of motion, enhanced muscle strength, better breathing, easier swallowing, and reduced sputum production. These improvements contributed to the patient's complete independence in performing daily life activities.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The subject gave informed consent to the work and was informed about the study's objectives, purpose, and procedure. The subject participation in the study was voluntary.

AUTHORSHIP CONTRIBUTION

Conceptualization: Kajal Kumari, Farah, Sachin Gupta, Priyanka.
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Writing - -revision and proof editing: Kajal Kumari, Farah, Sachin Gupta, Priyanka.