

# Prevalence of Neurogenic and Vascular Thoracic Outlet Syndrome Among Construction Site Worker Using ROOS and Adson Test

Rubina Jilani Pathan<sup>1</sup>, Dr. Gayatri Batkulwar<sup>2</sup>

<sup>1</sup>Intern, SVSS Latur College of Physiotherapy, Latur, Maharashtra.

<sup>2</sup>Assistant Professor, Department of Community Physiotherapy, SVSS Latur College of Physiotherapy, Latur, Maharashtra.

Corresponding Author: Rubina Jilani Pathan

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## ABSTRACT

**Background:** Thoracic outlet syndrome (TOS) typically presents with upper extremity symptoms resulting from the compression of neurovascular structures in the area of the neck, above the first rib 4. repetitively lifting and carrying heavy objects and also working in tough environment<sup>3</sup>. The sustained activities can be linked to repetitive work, loading of tendons, rupture of the muscle fibers along with muscle disorders 3. The clinical manifestations may include pain, paresthesia, numbness, weakness, fatigability, swelling, discoloration, in the upper extremities 2.

**Aim:** To find out the percentage distribution of neurogenic and vascular thoracic outlet syndrome among construction site workers.

**Objective:** To determine the prevalence of neurogenic thoracic outlet syndrome among construction site workers using ROOS test.

- To determine the prevalence of vascular thoracic outlet syndrome among construction site workers using Adson test.

**Methodology:** A observational study was conducted among construction-site workers. A total sample (n=40) was screened using the ROOS test and Adson test workers' demographic data, age groups (21–28 years; 29-36 years and 37-45 year), gender, and

work experience (1–10 years; 11–20years and 21-30 year) were recorded. The prevalence of positive ROOS and Adson cases was calculated, and subgroup analysis was performed. Data was then taken on Excel Sheet and Statistical analysis was done.

**Result:** There is 90% demonstrated a positive result for ROOS Test for neurogenic, 10% positive result for Adson test and 5% positive result for both tests.

**Conclusion:** The above study concluded that there is 90% positive for (ROOS Test) neurogenic, 10% positive for (Adson Test) Vascular and 5% Positive for both tests.

**Keywords:** Construction site worker, Thoracic outlet syndrome, Rapid open overhead sign test (ROOS), Adson test.

## INTRODUCTION

Construction workers often perform tasks that involve repetitive arm lifting, carrying heavy loads, and working with their arms in elevated position 1. The clinical manifestations may include pain, paresthesia, numbness, weakness, fatigability, swelling, discoloration, in the upper extremities 2. There are two types of thoracic outlet syndrome, Vascular thoracic outlet syndrome and Neurogenic outlet syndrome 5. Vascular thoracic outlet

syndrome can affect either the subclavian artery or the subclavian vein resulting in symptoms such as pain, swelling and heaviness 5. And neurogenic thoracic outlet syndrome result from 2compression, irritation, and chronic overuse injury of the brachial plexus roots, specifically within the scalene triangle at the base of the neck, the subpectoral space immediately below and lateral to the clavicle, or both leading to heaviness in upper arm, paresthesia in all five fingers / in 4-5 fingers / in 1-3 rd fingers, neck pain, supraclavicular pain, trapezius pain, arm/shoulder pain, occipital headache, chest pain 5.

**MATERIALS AND METHODS**

**ROOS Test (Rapid Open-Overhead Sign).**

**Participant’s position-** The patient standing or sitting and abduct the arm to 90 degrees, laterally rotates the shoulder, and flexes the elbow to 90 degrees so that the elbow is slightly behind the frontal plane.

**Procedure-** The patient then opens and closes the hands slowly for 3 minutes.

**Positive Test-** If the patient is unable to keep the arms in the starting position for 3

minute or suffers ischemic pain, heaviness or profound weakness of the arm or numbness and tingling of the hand during the 3 minutes. The test is considered positive for Thoracic Outlet Syndrome on the affected side.

**Negative Test-** Minor fatigue and distress are considered negative tests.

**Adson Maneuver Test**

**Participant Position-** The patient is in the sitting position.

**Therapist position-** Behind the participant.

**Procedure-** The therapist locates the radial pulse on the affected Side.

The therapist passively rotates the patient head toward the affected Side. The patient actively extends neck

and therapist laterally rotate and extend the affected shoulder. The patient then takes a deep breath and holds it.

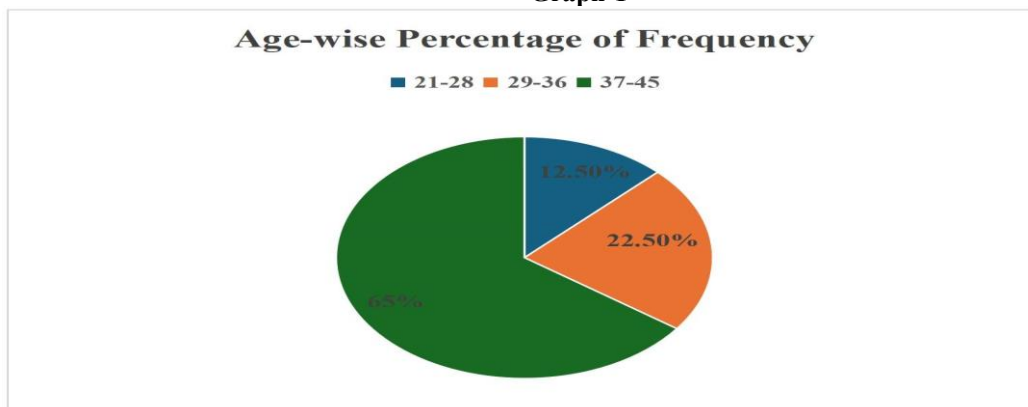
**Positive Test-** A disappearance of pulse and reproduction of the symptoms indicate a positive test for compression in scalene triangle.

**RESULT**

**Table-1 Age-wise distribution of Frequency and percentage of frequency of Thoracic outlet syndrome.**

Age	Frequency	Percentage (TOS)
21-28	5	12.50%
29-36	9	22.50%
37-45	26	65%

**Graph-1**

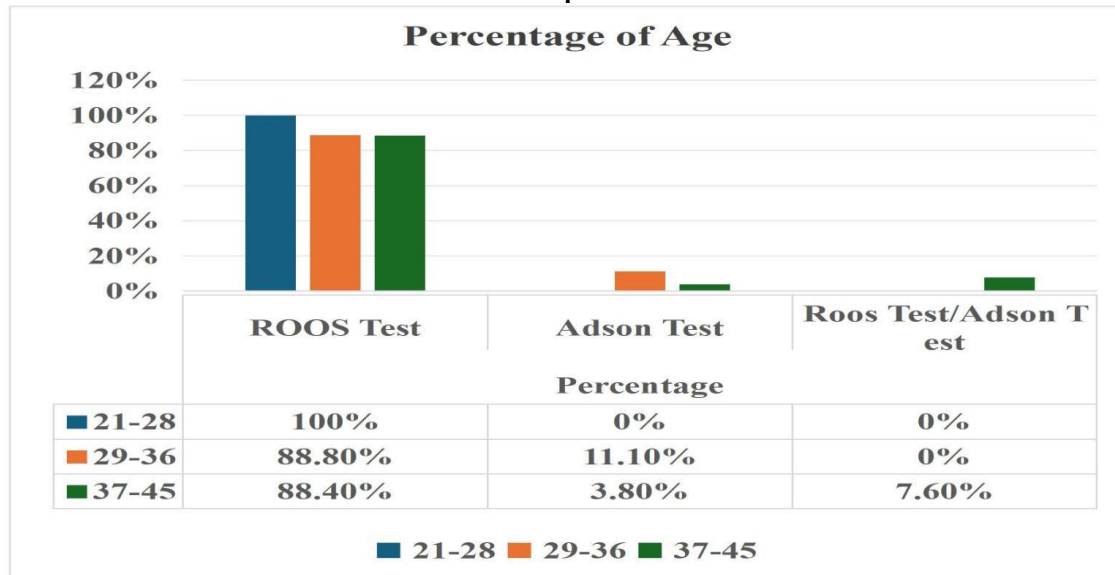


**Interpretation of Graph-1:** The graph shows that 12.5% in the 21-28 years age group. 29-36 age group 22.5% and 37-45 age group 65% for thoracic outlet syndrome.

**Table-2 Age-wise distribution of construction site workers.**

Age	Percentage		
	ROOS Test	Adson Test	Roos Test/Adson Test
21-28	100%	0%	0%
29-36	88.80%	11.10%	0%
37-45	88.40%	3.80%	7.60%

**Graph-2**

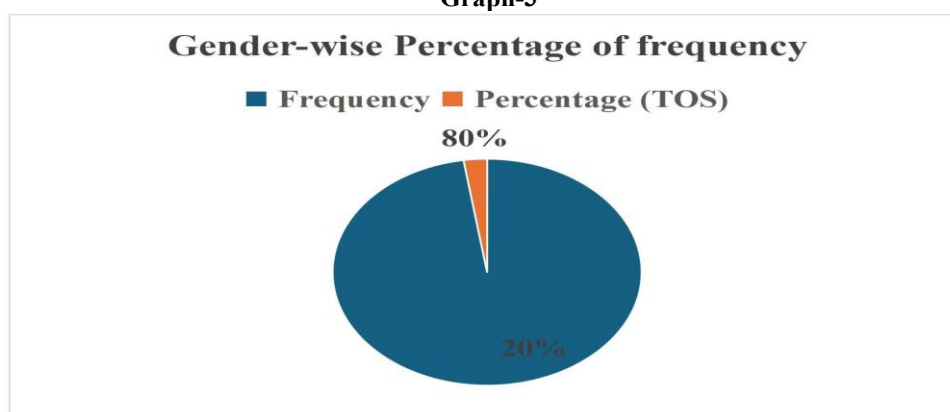


**Interpretation of Graph-2:** The graph shows that most workers fall in the 21-28 years age group 100% for ROOS Test. 29-36 age group 11.10% for Adson test and 37-45 age group 7.60% for both ROOS test and Adson test.

**Table-3 Gender-wise distribution of Frequency and percentage of frequency of Thoracic outlet syndrome.**

Gender	Frequency	Percentage (TOS)
Male	32	80%
Female	8	20%

**Graph-3**

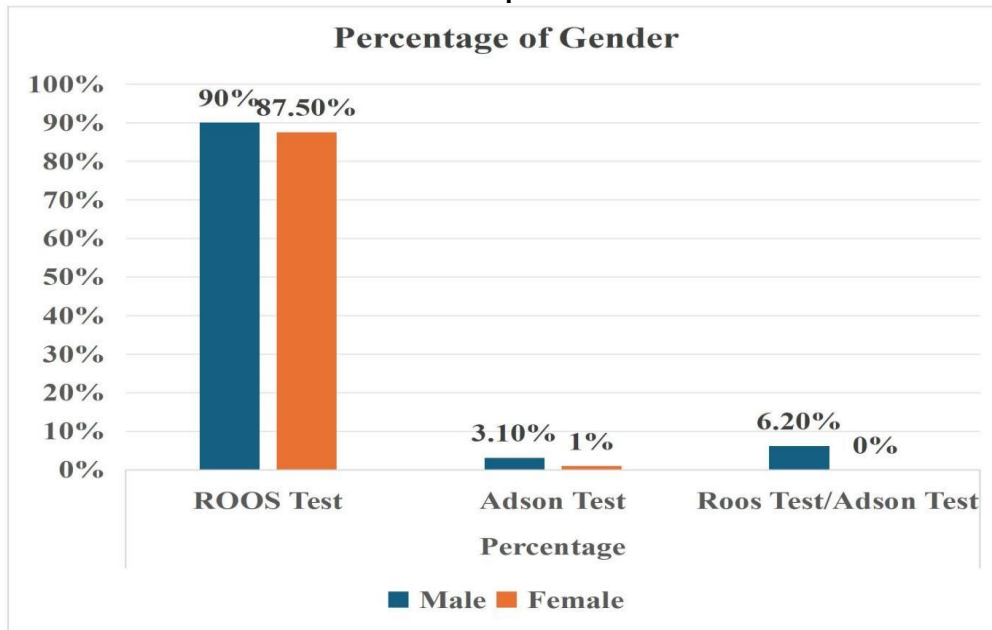


**Interpretation of Graph-3:** The graph shows that male 80% and 20% female For Thoracic outlet syndrome.

**Table-4 Gender-wise distribution of construction site workers**

Gender	Percentage		
	ROOS Test	Adson Test	Roos Test/Adson Test
Male	90%	3.10%	6.20%
Female	87.50%	1%	0%

Graph-4

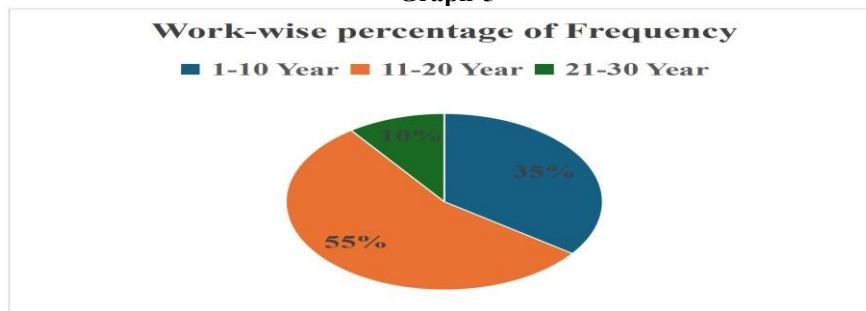


**Interpretation of Graph-4:** The graph indicates that the majority of workers were male 90% or female 87.5% for ROOS test, male 3.10% or female 1% for Adson test and for both test male 6.20% or 0% for female.

**Table-5 Work experience-wise distribution of Frequency and percentage of frequency of Thoracic outlet syndrome.**

Work Experience	Frequency	Percentage (TOS)
1-10 Year	14	35%
11-20 Year	22	55%
21-30 Year	4	10%

Graph-5

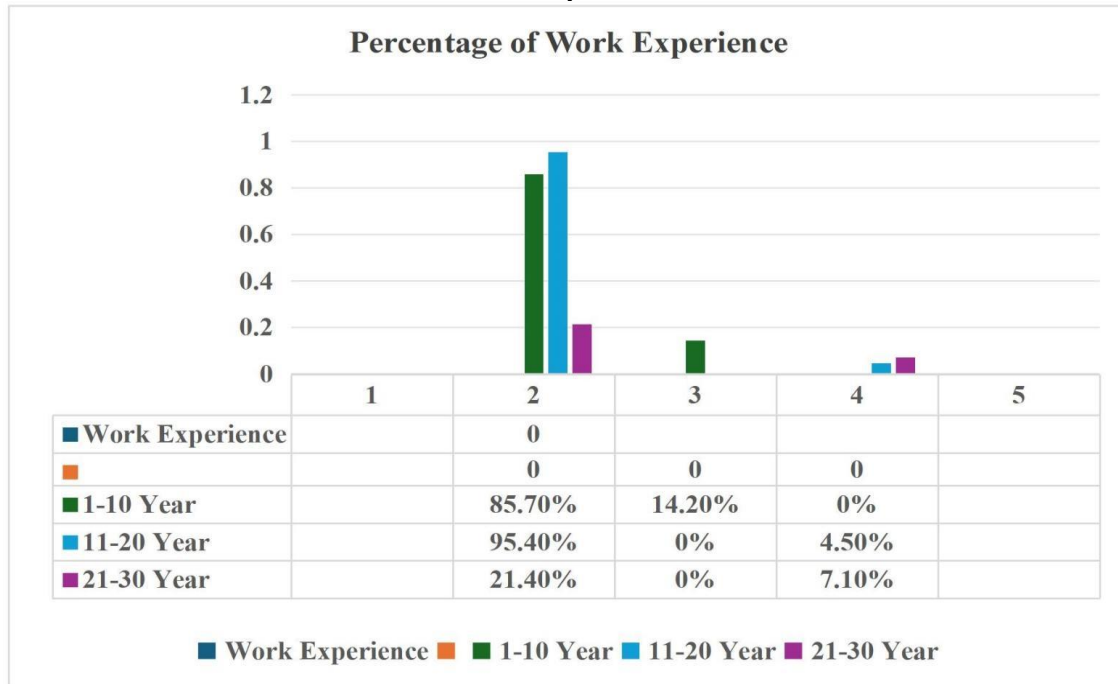


**Interpretation of Graph-5:** The graph shows that 35% in the 1-10 years of work experience.55% in the 11-20 year of work experience and 10% in the 21-30 year of experience.

**Table-6 Work experience-wise distribution of construction site workers**

Work Experience	Percentage		
	ROOS Test	Adson Test	Roos Test/Adson Test
1-10 Year	85.70%	14.20%	0%
11-20 Year	95.40%	0%	4.50%
21-30 Year	21.40%	0%	7.10%

Graph-6

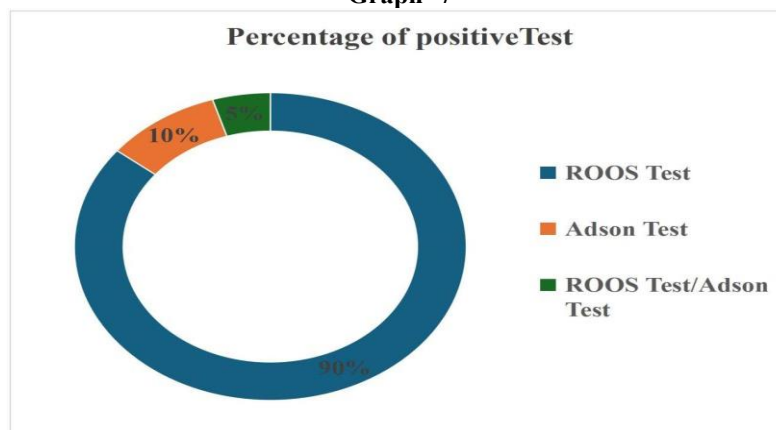


**Interpretation of Graph 6:** The graph shows that 95.40% of workers 11-20 years of work experience for ROOS test, 14.20% of workers 1-10 year for Adson test, while only 7.10% had 21–30 years of experience for both tests.

Table-7 Test wise distribution of construction site workers

Test Name	Percentage
ROOS Test	90%
Adson Test	10%
ROOS Test/Adson Test	5%

Graph- 7



**Interpretation of Graph 7:** The graph shows that 90% positive for ROOS test, 10% positive for Adson test and 5% positive result for both test.

## DISCUSSION

The present study aimed to identify the prevalence of neurogenic and vascular thoracic outlet syndrome (TOS) among construction site workers using ROOS and Adson tests. The results of this study

showed that Out of 40 participants, 90% of participants were positive for the ROOS test, 10% were positive for the Adson test, and 5% showed positive results for both tests, indicating the presence of combined neurovascular compression. From a clinical

reasoning perspective, the ROOS Test 90%, Adson test 10% and for both test 5% prevalence observed aligns with the biomechanical demands of construction work. Repeated elevation of the arms narrows the 31costoclavicular and scalene triangle spaces, where neurovascular structures pass, thereby producing ischemic pain, paresthesia, and weakness.

## CONCLUSION

The present study concluded that the prevalence of Thoracic Outlet Syndrome (TOS) among construction site workers is significantly high, with 90% showing positive results for the ROOS test (neurogenic TOS), 10% positive for the Adson test (vascular TOS), and 5% showing combined positive results for both tests.

### Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgement:** None

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**Conflict of Interest:** No conflicts of interest declared.

## REFERENCES

1. Chordiya S, Nikhade N. Prevalence of Musculoskeletal Disorders in Workers in An Industry in Ahmednagar District, Maharashtra. *International Journal of Clinical and Biomedical Research*. 2019 Apr 28;38-41.
2. Khawla K, Ali H, Zohaib M, Alam S, Nawaz R. Prevalence of Thoracic Outlet Syndrome Among Patients Visiting Physical Therapy Outpatient Department of Public Sector Tertiary Care Hospitals, Peshawar.
3. Milenovic N, Klasnja A, Skrbic R, Popovic Petrovic S, Lukac S, Devecerski G. Sleep problems and disabilities of the arm, shoulder, and hand in persons with thoracic outlet syndrome—a cross-sectional study. *International Journal of Environmental Research and Public Health*. 2022 Sep 30;19(19):12486.
4. Chandra V, Little C, Lee JT. Thoracic outlet syndrome in high-performance athletes. *J Vasc Surg*. 2014 Oct;60(4):1012-7; discussion 1017-8. doi: 10.1016/j.jvs.2014.04.013. Epub 2014 May 14. PMID: 24835692.
5. Magee DJ. *Orthopedic physical assessment*. 7th ed. Shoulder.40
6. Brotzman SB, Manske RC. *Clinical Orthopaedic Rehabilitation: An Evidence-based Approach*. 3rd ed. Philadelphia: Elsevier Health Sciences, 2011.
7. Brantigan CO, Roos DB. Diagnosing thoracic outlet syndrome. *Hand clinics*. 2004 Feb 1;20(1):27-36.
8. Otoshi K, Kikuchi S, Kato K, Sato R, Igari T, Kaga T, Shishido H, Konno S, Koga R, Furushima K, Itoh Y. The prevalence and characteristics of thoracic outlet syndrome in high school baseball players. *Health*. 2017 Aug 25;9(08):1223.
9. Laulan J, Fouquet B, Rodaix C, Jauffret P, Roquelaure Y, Descatha A. Thoracic outlet syndrome: definition, aetiological factors, diagnosis, management and occupational impact. *Journal of occupational rehabilitation*. 2011 Sep; 21:366-73.
10. Reddy GM, Nisha B, Prabhushankar TG, Vishwambhar V. Musculoskeletal morbidity among construction workers: A cross-sectional community-based study. *Indian journal of occupational and environmental medicine*. 2016 Sep 1;20(3):144-941
11. Meo SA, Alsaaran ZF, Alshehri MK, Khashougi MA, Almeterk AA, Almutairi SF, Alsaeed SF. Work-related musculoskeletal symptoms among building construction workers in Riyadh, Saudi Arabia. *Pakistan journal of medical sciences*. 2013 Nov;29(6):1394.
12. Kuhn JE, Lebus GF, Bible JE. Thoracic outlet syndrome. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 2015 Apr 1;23(4):222-32.
13. Franklin GM. Work-related neurogenic thoracic outlet syndrome: diagnosis and treatment. *Physical Medicine and Rehabilitation Clinics*. 2015 Aug 1;26(3):551-61.
14. Ferrante MA. The thoracic outlet syndromes. *Muscle & nerve*. 2012 Jun;45(6):780-95.42
15. ROOS DB, OWENS JC. Thoracic outlet syndrome. *Archives of Surgery*. 1966 Jul 1;93(1):71-4.
16. RIDDELL DH, SMITH BM. Thoracic and Vascular Aspects of Thoracic Outlet Syndrome: 1986 Update. *Clinical Orthopaedics and Related Research (1976-2007)*. 1986 Jun 1; 207:31-6.

17. Cordobes-Gual J, Lozano-Vilardell P, Torreguitart-Mirada N, Lara-Hernández R, Riera-Vazquez R, Julia-Montoya J. Prospective study of the functional recovery after surgery for thoracic outlet syndrome. *European Journal of Vascular and Endovascular Surgery*. 2008 Jan 1;35(1):79-83.
18. Novak CB. Thoracic outlet syndrome. *Clinics in plastic surgery*. 2003 Apr 1;30(2):175-88.
19. Masocatto NO, Da-Matta T, Prozzo TG, Couto WJ, Porfirio G. Thoracic outlet syndrome: a narrative review. *Revista do Colégio Brasileiro de Cirurgiões*. 2019 Dec 20;46: e20192243.
20. Arellano K. Thoracic outlet Syndrome Decompression and the Effect of Physical Therapy in the Outpatient Setting: A Case Study.
21. Nuutinen H, Kärkkäinen JM, Kimmo M, Voitto A, Teemu R, Petri S, Janne P. Long-term outcomes of transaxillary versus video-assisted first rib resection for neurogenic thoracic outlet syndrome. *Interactive CardioVascular and Thoracic Surgery*. 2022 Jul 1;35(1): ivac040.
22. Demirbag D, Unlu E, Ozdemir F, Genchellac H, Temızoz O, Ozdemir H, Demir MK. The relationship between magnetic resonance imaging findings and postural maneuver and physical examination tests in patients with thoracic outlet syndrome: results of a double-blind, controlled study. *Archives of physical medicine and rehabilitation*. 2007 Jul 1;88(7):844-51.
23. Nakabayashi K, Ando H. Venous Thoracic Outlet Syndrome Provoked by Sleeping Posture.
24. SChang DC, Rotellini-Coltvet LA, Mukherjee D, De Leon R, Freischlag JA. Surgical intervention for thoracic outlet syndrome improves patient's quality of life. *Journal of Vascular Surgery*. 2009 Mar 1;49(3):630-7.

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