

# Landmark for Identifying Spinal Accessory Nerve in Anterior Triangle of Neck-Surgeon's Perspective



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## Abstract

There have been multiple studies on defining landmarks for spinal accessory nerve but most of them have stressed upon the identification of nerve in the posterior triangle of the neck. I have highlighted few landmarks that are less known for identification of spinal accessory nerve and their importance. The five landmarks which were analysed are posterior belly of digastric, transverse process of atlas, internal jugular vein, sternocleidomastoid muscle and small calibre veins present superficial to spinal accessory nerve.

**Keywords:** Spinal accessory nerve; Posterior belly of digastrics; Transverse process of atlas

## Introduction

Identifying the spinal accessory nerve is of utmost importance in neck dissection. The injury to the nerve results in significant shoulder dysfunction with limited overhead abduction and progressive winging of scapula. There have been multiple studies on identifying the spinal accessory muscle but most of them are oriented to define the course of spinal accessory muscle in the posterior triangle. I have tried to look for the landmarks to help identifying the spinal accessory nerve in the anterior part of the neck while operating level II nodal basin.

## Methodology

I have done 50 neck dissections in consecutive patient with various head and neck cancers. I had observed the course and relation of spinal accessory nerve to constant landmarks- posterior belly of digastric, sternocleidomastoid muscle, transverse process of atlas vertebrae and internal jugular vein. I observed that the relation of spinal accessory nerve is variable with internal jugular vein and sternocleidomastoid. The relation with transverse process of atlas and posterior belly of digastric were constant.

## Result

I analysed the course of spinal accessory nerve with respect to internal jugular vein, in 44 (88 percent) cases out of 50 cases, the nerve was crossing the vein anterior to it and in 6 cases the nerve went deeper to the vein. With respect to sternocleidomastoid, in 36 cases out of 50 cases, the nerve went through the muscle and rest 14 (28 percent of the cases), the nerve went deeper to the muscle. The transverse process of atlas was a very reliable landmark with

nerve passing within 1 cm distance. In 40 cases out of 50, the nerve went on the anterior surface of the process and rest 10 cases it went lateral to it. With surgery point of view, the nerve went deeper to the posterior belly of digastric in all 50 cases and in 48 cases out of 50, it crossed the posterior belly of digastric at its midpoint. In the rest 3 cases, it went closer to junction of tendon and posterior belly of digastric than the midpoint of posterior belly of digastrics. In all the cases, a small vein was present superficial to spinal accessory nerve near the sternocleidomastoid; in 33 cases, it was a single small calibre vein whereas in 15 cases there were 2 small veins and in 2 cases there were leash of vessels passing superficial to the spinal accessory nerve.

## Discussion



**Figure 1:** Spinal accessory nerve with relation to posterior belly of digastric, Internal jugular Vein and sternocleidomastoid muscle.

There have been multiple studies for describing landmarks for spinal accessory nerve but very few have looked at the anterior part of the nerve. The most famous and accepted landmark is relation of spinal accessory nerve with greater auricular nerve looping over the posterior border of the sternocleidomastoid. I have tried to look upon the landmarks which help the surgeons identify the spinal accessory nerve anteriorly especially in difficult cases like post radiotherapy neck dissection or revision neck surgery. I have looked for 5 landmarks for identification of spinal accessory nerve in the anterior triangle of the neck (Figure 1).

## a. Relation of the nerve with posterior belly of digastric

This landmark has been one of the least remarked landmark in the literature but I feel it is very helpful for quick and accurate identification of the spinal accessory nerve. In my experience, the nerve unfailingly passes deeper to the muscle and, in most of the cases (96%), it passes in the plane corresponding to the midpoint of posterior belly of digastric and in few cases slightly medial to the midpoint closure to the tendon of digastric. This is an important landmark as it is helpful to look for the nerve in cases with enlarged level II nodes. My observation also correlates with the observation made by Durazzo et al [1] in cadaveric study of 40 cases. They found that the nerve crosses the posterior belly of digastric at an average distance of 1.7cm and the average length of the posterior belly of digastric is 3.7 cm on the left side and 3.15 cm on the right side [2]. This data correlates with my observation.

## b. Relation of the nerve with transverse process of atlas vertebrae

In my study, the nerve was always present in the proximity of transverse process of atlas vertebra and in 80 percent of the cases, the nerve crossed the transverse process anteriorly and superficially this fact confines with the findings of both Durazzo et al. and Becker and Parell [3]. This landmark is constant as transverse process of atlas is very prominent in the neck compared to other vertebrae but the only disadvantage is that this landmark is identified with palpation than direct vision and becomes obvious once the fat and nodes from the concerned area is cleared.

## c. Relation of the nerve with Internal jugular vein

In my case series, I found that the nerve crossed the IJV (Internal Jugular Vein) superficially in 88 percent of cases and in the rest it went deeper to the IJV. This is in coherence to the other available data [4,5]. In most of the data available, the variant where the nerve crossed IJV anteriorly constitutes upto 80-90 percent of cases. There has been a rare variation reported where the internal jugular vein bifurcate and re-joins inferiorly and the nerve passes in between the bifurcation of internal jugular vein. This is an uncommon situation but should be kept in mind to prevent undue vascular or neural injury [6].

## d. Relationship of the nerve with sternocleidomastoid muscle

In my series, the nerve passed through the sternocleidomastoid muscle in 72 percent of cases and deeper to muscle in rest of the case. This is not coherent with Durazzo et al. [1] wherein only 55 percent cases had the nerve passing through the sternocleidomastoid muscle. There is not much data concerned with this but the relevance of knowing this variation is to be cautious while identifying the spinal accessory nerve as it can be confused with cervical nerve roots if passing deeper to the sternocleidomastoid muscle.

## e. Relation of nerve with small calibre veins

In my series, all the patients had small calibre veins superficial to the spinal accessory nerve. In 66 percent of the cases, it was a single vessels which could easily be bipolarised and in rest of the cases, there were 2 or more vessels. The importance of these vessels was highlighted by Chaukar et al. [7]. These vessels indicate that the nerve is in vicinity, the identification and coagulation of these vessels is important otherwise attempt to achieve haemostasis after the bleed, may result in injury to spinal accessory nerve.

## Conclusion

Prevention of injury to spinal accessory nerve is of utmost importance during a neck dissection. I have tried to highlight the landmarks for preservation of spinal accessory in the anterior triangle of the neck which are posterior belly of digastric, transverse process of atlas, internal jugular vein, sternocleidomastoid muscle and small calibre veins present superficial to spinal accessory nerve.

## References

1. Durazzo MD, Furlan JC, Teixeira GV, Friguglietti CUM, Kulcsar MAV, et al. (2009) Anatomic landmarks for localization of the spinal accessory nerve. *Clin Anat* 22: 471-475.
2. Vrinda Hari Ankolekar, Anne D Souza, Rohini Alva, Antony Sylvan D Souza, Mamatha Hosapatna (2015) Posterior belly of the digastric muscle: An important landmark for various head and neck surgeries. *Arch Clin Exp Surg* 4: 79-82.
3. Becker GD, Parell GJ (1979) Technique of preserving the spinal accessory nerve during radical neck dissection. *Laryngoscope* 89: 827-831.
4. Saman M, Etebari P, Pakdaman MN, Urken ML (2011) Anatomic relationship between the spinal accessory nerve and the jugular vein: a cadaveric study. *Surg Radiol Anat* 33: 175-179.
5. Hinsley ML, Hartig GK (2010) Anatomic relationship between the spinal accessory nerve and internal jugular vein in the upper neck. *Otolaryngol Head Neck Surg* 143(2): 239-241.
6. Gardiner KJ, Irvine BW, Murray A (2002) Anomalous relationship of the spinal accessory nerve to the internal jugular vein. *Clin Anat* 15(1): 62-63.
7. Chaukar DA, Pai A, D'Cruz AK (2006) A technique to identify and preserve the spinal accessory nerve during neck dissection. *J Laryngol Otol* 120: 494-496.



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