



# Pectoral Nerves – A Third Nerve and Clinical Implications

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## Introduction

The textbook description of the pectoral nerves describes a medial and lateral pectoral nerve arising from the medial and lateral cords, respectively, to innervate the pectoralis major and minor muscles. Studies have described variations in the origins and branching of the pectoral nerves and even in the muscles they innervate (Porzionato et al., 2011, Larionov et al., 2020). There have also been reports of three pectoral nerves with distinct origins (Aszmann et al., 2000) and variability of the spinal nerve fibers contributing to these nerves (Lee, 2007). Given the frequency of reported variation from the textbook description, reexamining the origin, course and branching of the pectoral nerves could prove useful for students and clinicians alike. The pectoral nerves are implicated in a variety of cases including surgeries of the breast, pectoral, and axillary region (David et al., 2012). Additionally, the lateral pectoral nerve has recently gained attention for potential use as a nerve graft for other damaged nerves such as the spinal accessory nerve (Maldonado, et al., 2017). The objective of this study was to assess the frequency and patterns of pectoral nerve branching in order to more accurately describe their orientation and implications in clinical cases.

## Methods

- Two researchers independently isolated the pectoral nerves bilaterally from the brachial plexuses of 34 embalmed human anatomical donors that had previously been dissected in 1st-year medial gross anatomy
- Each brachial plexus side was considered an independent observation
- A standardized form was developed and implemented to record donor information and data related to pectoral nerve distribution
- Each brachial plexus observation with the pectoral nerves isolated was photographed and stored using university owned equipment
- Descriptive statistics and analyses were performed using Microsoft Excel software
- Original sample size included 68 brachial plexus observations from 34 anatomical donors
- Observations were excluded if the pectoral nerves were damaged or absent due to previous dissection
- Final sample size was 50 brachial plexus observations from 31 anatomical donors, 14 male and 17 female

## Summary

**Table 1.** Initial Dataset and Observations

	Total (n)	Relative Percentage (%)
Brachial Plexus Samples in Dataset	50	100
Samples With 3 Branch Pattern	29	58
Samples With 2 Branch Pattern	20	40
Samples With 1 Branch Pattern	1	2
Ansa Pectoralis Present	32	64
Cadavers in Sample Dataset	31	100

Table 1: Initial Dataset and Observations  
Our initial dataset consisted of 31 anatomical donors, dissected bilaterally. Each side was considered an independent observation. Of the 62 brachial plexuses, 50 met our inclusion criteria.

**Table 2.** Branching Patterns of Pectoral Nerves

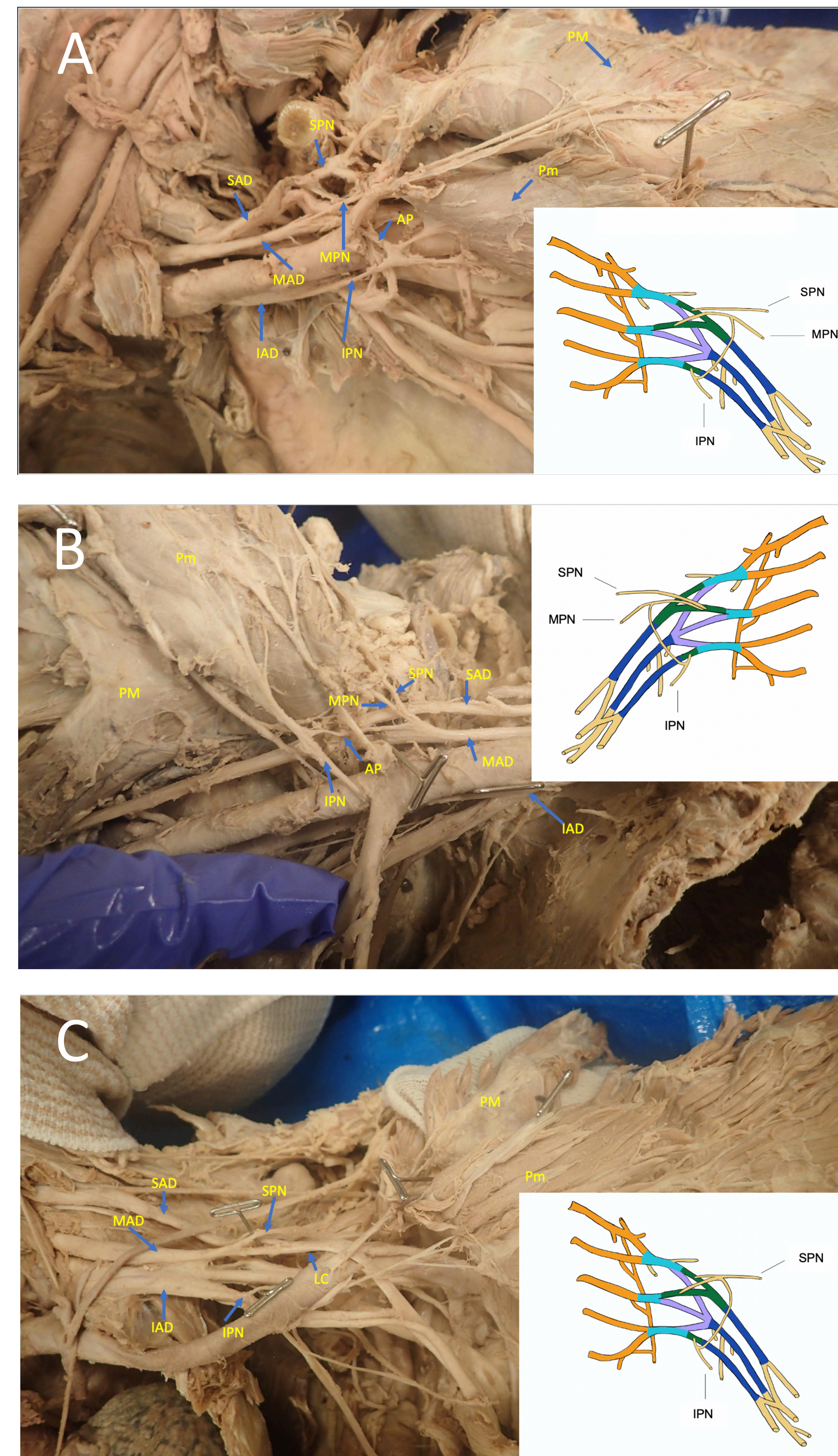
Branching Pattern	Frequency (n)	Frequency (% of total samples)
<b>3 branch</b>	29	58
3a	20	40
3b	4	13.8
3c	2	6.9
3d	1	3.5
3e	1	3.5
3f	1	3.5
<b>2 branch</b>	20	40
2a	6	12
2b	6	12
2c	4	8
2d	2	4
2e	1	2
2f	1	2
<b>1 branch</b>	1	2
1a	1	2

Table 2: Branching Patterns of Pectoral Nerves  
The pectoral nerve observations from table 1 were categorized as having 1, 2, or 3 branches with distinct origins from the brachial plexus. They were further categorized as a-f based on their origins as described in table 3.

**Table 3.** Descriptions of Branching Variations

Variation	Origin of Most Superior Nerve	Origin of Middle Nerve	Origin of Most Inferior Nerve
3a	SAD	MAD	IAD
3b	MAD	MAD	IAD
3c	LC	LC	IAD
3d	SAD	LC	IAD
3e	SAD	SAD	IAD
3f	SAD	MAD	MAD
2a	SAD and MAD		IAD
2b	LC		IAD
2c	MAD		IAD
2d	LC		LC
2e	SAD		IAD
2f	SAD		MAD
1a		MAD	

Table 3: Descriptions of Pectoral Nerves  
Branching patterns were categorized based on the origins of the pectoral nerve branches. Superior anterior division (SAD), middle anterior division (MAD), inferior anterior division (IAD), lateral cord (LC), medial cord (MC).



**Figure 1.** Three commonly observed pectoral nerve branching variations; the 3a variation (A), the 3b variation (B), and the 2a variation (C).

## Conclusions

Presented here are the initial observations of various pectoral nerves branching patterns and descriptions of the patterns observed. The most frequent branching pattern observed was that of three pectoral nerves with origins from the superior, middle, and inferior anterior divisions coursing to the clavicular, sternal, and costal area of the pectoralis major muscle seen in **Figure 1.A**. This most frequently observed pectoral nerve branching pattern and spatial arrangement contrasts with the textbook description of the pectoral nerves. This expanded knowledge will be valuable to clinicians and implicated in surgical cases of the breast, axillary, and pectoral regions as well as in nerve grafts or injury of the pectoral nerves.

## Key Abbreviations

- SAD – superior anterior division
- MAD – middle anterior division
- IAD – Inferior anterior division
- LC – lateral cord
- MC – medial cord

References  
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