

## Quantitative analysis of cadaveric axillary lymph nodes

**Authors:** Mierra Robinson, Student, PCOM Georgia; Shelley DiCecco, Professor; Brandon Boeur, Student; Alicia Schmidt, Student; Samuel Ighodaro, Student; Yuhyun Kang, Student; Vikas Damineni, Student

**Introduction:** With the rise of new techniques to study lymphatic structures, there has been renewed interest in obtaining more details of lymphatic anatomy. Currently, published sources state a range of 8 to 50 lymph nodes in the axilla region with an average of 10–24.

**Aim:** The aim of this study was to investigate ranges of axillary nodes (pectoral, infraclavicular, parasternal, subscapular, and central) to provide a more concise range of total and regional axillary nodes. Accurate ranges can help with assessing clinical management involving axillary nodes dissection and/or dysfunction.

**Method:** Quantitative analysis was performed on axillary nodes in cadavers, specifically the central, humeral, infraclavicular, parasternal, pectoral, and subscapular anatomical regions of the axillary nodes. A total of 71 cadavers were used in the study, with inspection of right and left sides. There were 41 female and 30 male cadavers of multiple races. Statistical analysis was performed using JMP Pro 17.

**Results:** Power analysis evaluating the sample size of the data was 23.21% for parasternal, 92.40% for infraclavicular, 92.91% for central, 98.36% for pectoral, 73.87% for humeral, and 87.78% for the subscapular region. There was a mean total range of lymph nodes of 4-7 for parasternal, 2-4 for infraclavicular, 2-5 for central, 4-7 for pectoral, 1-3 for humeral, and 2-5 for the subcapsular region; all with a CI = 95%. When comparing the axillary lymph node regions with regards to sex, there is no statistically significant difference ( $p < .05$ ) between the regions, except for the subscapular region ( $p = .02$ ). With regards to the left versus right side, there is no statistically significant difference ( $p < .05$ ) in any of the regions. The current study produced an average 15-31 lymph nodes in the axilla. An average of 9-15 nodes were reported for the axillary region by Schaapveld et al. and  $13.40 \pm 3.13$  by Tenhofir et al. (Schaapveld, Tenhofir).

**Conclusion:** Despite the advances in medical imaging and technology, limited research exists on the quantitative ranges of lymph nodes. The lymphatic system is frequently associated in the staging and treatment of cancer via lymphadenectomies. However, one of the most common side effects of the surgical removal of lymph nodes is lymphedema. Producing more precise lymph node ranges can provide healthcare practitioners with more accurate percentages of possible dysfunction (number removed out of possible range); thereby providing better expectations for patient outcomes in lymphedema management.