Methods

• Six brachial plexuses were dissected in 4 Wisconsin miniature swine for gross studies.
• For histology, brachial plexus nerves were used from 3 recently deceased humans, 1 embaled human, and in 3 Wisconsin Miniature Swine.
• The nerves were harvested, fixed in 2.5% glutaraldehyde for 24 hours, and then myelin was labeled by fixation with 2% osmium tetroxide for 2 hours.
• The nerves were then paraffin embedded and sectioned transversely 5 µm thick.
• The slides were imaged with a Keyence BZ9000 microscope and counted with analyzer software.
• All axons with a diameter greater than 1 µm were counted
• Images below were counterstained with Masson's Trichrome

Results: Gross Anatomy

Figure 5. Anterior exposure of the human right brachial plexus. 1 = phrenic nerve; 2 = UT; 3 = MT; 4 = UT; 5 = posterior cord; 6 = lateral cord; 7 = medial cord; 8 = axillary artery; 9 = upper and lower subscapular nerves; 10 = axillary nerve; note in this specimen the posterior division of the UT and MT after the branching of the axillary nerve; 11 = radial nerve; 12 = musculocutaneous nerve; 13 = median nerve; 14 = ulnar nerve; 15 = medial antebrachial cutaneous nerve. Note the SPA arrangement from craniodorsal to caudoventral

Conclusions

• Despite the similarity in the body size, there is discrepancy in nerve size due to the stronger shoulder girdle muscles in the swine, and their suprascapular nerves had a lot more axons than in human.
• Due to the demand of fine motor functions in the human hand, their median and ulnar nerves have more axons than the swine.
• Bearing in mind the differences between the 2 species, the swine model would be a good one to study brachial plexus injuries.

References