

Background: The distal ulna osteotomy is a procedure regularly performed for primary ulnar impaction syndrome and distal radius fracture malunions. There is a relatively high rate of reoperation due to nonunions occurring in 6-12% of cases. Disruption of the vascular supply to the healing periosteum, is a hypothesized mechanism for these nonunions. While the blood vessels of the distal forearm and wrist have been extensively described in the literature, there has been no study describing the vasculature of the distal ulna periosteum. Here, we propose an anatomic study to characterize the blood supply of the distal ulnar periosteum, with a specific focus on identifying watershed regions or areas of decreased vascularity.

Methods: This is an anatomic study utilizing cadaver tissue. Cadaver arms underwent intravascular injection with india ink and dissection of the distal ulna. Age, sex and weight were provided by the tissue supply company. Descriptive dissection data was collected including ulna length, number and distribution of periosteal vessels, watershed areas, and clinical photos. Additionally, qualitative assessments were made by the authors regarding patterns in blood supply and trends in these were reported.

Results: 5 cadaver arms were imaged and dissected. All quantitative data can be found in Table 1. All were noted to have more volar perforators compared to dorsal. Cadaver arms consistently had an area of no vascularity in the region between the pronator quadratus insertion and the distal extent of the flexor & extensor muscle bellies. Most of these watershed areas were centered ~7cm from the styloid.

Discussion: Our data shows a consistent trend for more of the vasculature of the distal ulna to arise volarly compared to dorsally. Additionally, there is a region of hypovascularity that was observed in all the dissected arms that is located where a distal ulna osteotomy would typically be made. These findings suggest that location of distal ulna osteotomies and plate placement may contribute to the high nonunion rate. However, our study is limited by the small sample size and the fact it was a mostly qualitative cadaver study.