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Anatomical localization of the anterior interosseous nerve motor entry point in relation to pronator quadratus and bony landmarks

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Abstract

Purpose

The pronator quadratus is a deep muscle of the distal volar forearm. Its anatomy is relevant to electrodiagnosis of anterior interosseous nerve lesions, injection for pronator spasticity, and volar surgical approaches to the distal radius. The normative data for the Indian population are lacking. This study documented the dimensions of the muscle, localised the motor entry point of the anterior interosseous nerve from bony surface landmarks, and described the intramuscular branching of the nerve.

Methods

Thirty formalin-fixed disarticulated upper limb specimens (15 right, 15 left) were dissected and measurements were taken with a digital vernier calliper. The motor entry point was referenced to the tips of both the radial and ulnar styloid processes and expressed as a proportion of forearm length, and intramuscular branching was classified in a subset of ten specimens.

Results

The entry point lay 67.95 ± 7.70 mm from the radial styloid and 61.43 ± 8.35 mm from the ulnar styloid, placing it in the distal fifth of the forearm (21.4 ± 3.0% of its length). Mean nerve length was 112.48 ± 5.60 mm and mean arterial pedicle length was 107.08 ± 4.38 mm. Muscle widths fell at the lower end of published ranges, with no significant side-to-side difference for any parameter. Gradual branching was the most common intramuscular nerve pattern.

Conclusion

These measurements provide a population-specific reference for electrodiagnostic needle placement, injection therapy, and volar surgical planning.

Introduction

The pronator quadratus (PQ) is a short, flat muscle occupying the deepest layer of the distal volar forearm. It functions as a primary muscle of forearm pronation and a stabiliser of the distal radioulnar joint [7]. Despite its small dimensions, the PQ has significant clinical relevance across three domains: it is the key muscle in the electrodiagnosis of anterior interosseous nerve (AIN) lesions [9], a target for botulinum toxin injection in the management of forearm pronator spasticity [13], and a muscle preserved during volar plate fixation of distal radius fractures [2, 5].

The AIN innervates the PQ as its most distal target. Needle electromyography (EMG) of the PQ is the preferred test in confirming the diagnosis of anterior interosseous nerve syndrome; however, the deep location of the muscle makes accurate needle placement technically demanding [14]. Existing descriptions for PQ needle insertion reference the ulnar styloid process [8] or rely on fingerbreadth-based measurements [12]. These techniques are susceptible to inter-individual variability and may be unreliable in populations with different anthropometric characteristics.

Previous cadaveric studies have examined PQ morphometry and AIN motor entry point localisation in Western, Korean, and Turkish populations [1, 4, 6]. Choung et al. specifically identified the AIN entry zone for EMG needle placement guidance, referenced from a vertical line through the ulnar styloid process [3]. However, comparable normative data for the Indian population are absent. The AIN motor entry point distance from both the radial and ulnar styloid processes as dual bony surface landmarks has rarely been documented. Furthermore, the intramuscular AIN branching pattern has not been characterised in an Indian cadaveric series, the knowledge of which is important to prevent nerve injury during volar surgical approaches.

The present study therefore aimed to: (1) document the morphometric dimensions of the PQ and the vascular pedicle length of the anterior interosseous artery (AIA) in formalin-fixed cadaveric specimens; (2) localise the AIN motor entry point into the PQ using both the radial and ulnar styloid processes as bony surface landmarks and express this as a proportion of forearm length; and (3) characterise the intramuscular AIN branching pattern according to the classification of Svízenská et al.[15]The findings are intended to provide a preliminary population-specific normative reference data relevant to electrodiagnosis, injection therapy, and volar surgical planning in the Indian population.

Materials and methods

Study design and specimen selection

This was a descriptive cadaveric study conducted in the Department of Anatomy, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India. Thirty formalin-fixed disarticulated upper limb specimens (15 right and 15 left) were obtained from the departmental cadaveric collection. As these were disarticulated limb specimens from the institutional repository, individual demographic data including age and sex were unavailable for documentation.

Specimens were included only when the distal forearm soft tissue structures were macroscopically intact and well preserved. Specimens showing evidence of prior surgical intervention, traumatic deformity, significant tissue deterioration, or disruption of the volar forearm compartment were excluded. All 30 specimens meeting the inclusion criteria were studied.

The cadaveric specimens were obtained through the voluntary body donation programme of the Department of Anatomy, JIPMER, Puducherry (see Declarations). The study was conducted with due

respect and dignity for the donors and was restricted to morphological documentation without significant structural disfigurement of the specimens.

Surgical exposure

All dissections were performed using a standardised volar approach to the distal forearm, consistent with the surgical access described for PQ flap harvesting [1]. A curvilinear incision was made on the anterior (volar) aspect of the forearm, extending from the proximal wrist crease proximally. Skin flaps were carefully elevated and reflected. The antebrachial fascia was incised longitudinally to expose the flexor compartment.

The flexor carpi radialis (FCR) was retracted radially. The flexor digitorum superficialis (FDS) and flexor digitorum profundus (FDP) were subsequently retracted to expose the deep compartment of the distal forearm. The PQ muscle was identified, lying on the anterior surface of the interosseous membrane.

The neurovascular bundle, comprising the anterior interosseous artery (AIA), its accompanying venae comitantes, and the anterior interosseous nerve (AIN) were identified coursing on the flexor surface of the interosseous membrane and entering the PQ through its deep surface [1, 6]. (Fig. 1)

Instruments and measurement technique

All linear measurements were performed using a standard digital vernier calliper with a measurement precision of ± 0.01 mm, and recorded in millimetres. Measurements on right and left specimens were recorded independently. All dissections and measurements were performed by the same team of investigators throughout the study to minimise inter-observer variability. To assess intra-observer reproducibility, a random subset of ten specimens was re-measured by the primary investigator on a separate occasion; the mean absolute difference between repeated measurements was less than 1.0 mm for all parameters, indicating acceptable measurement consistency.

Morphometric measurements of the pronator quadratus

The following parameters were recorded for each specimen. The proximal and distal radial extents were the straight-line distances from the proximal and distal borders of the PQ at its radial insertion to the tip of the radial styloid process. The proximal and distal ulnar extents were the corresponding straight-line distances from the proximal and distal borders of the PQ at its ulnar origin to the tip of the ulnar styloid process. The proximal width of the PQ was measured as the transverse dimension of the muscle at its proximal border, and the distal width as the transverse dimension at its distal border. Forearm length was recorded as the straight-line distance from the medial epicondyle of the humerus to the tip of the ulnar styloid process. All measurements were made with the specimens in a neutral, fixed position as

determined by formalin fixation; active forearm pronation or supination was not applicable in the cadaveric context.

Vascular pedicle length

The length of the vascular pedicle was defined as the straight-line distance from the point of origin of the AIA at its departure from the common interosseous artery to its point of entry into the deep surface of the PQ muscle [1, 6].

Anterior interosseous nerve: length and motor entry point

The AIN was carefully traced along its course on the flexor surface of the interosseous membrane. The length of the AIN for the purposes of this study was defined as the distance from the point at which the AIN gives its first muscular branch to the flexor pollicis longus (FPL) to the point at which the nerve enters the deep surface of the PQ muscle. This definition was adopted to standardise the measurement and ensure reproducibility across specimens.

The motor entry point of the AIN into the PQ was localised with reference to two palpable bony surface landmarks. Two straight-line distances were independently recorded for each specimen: from the motor entry point to the tip of the radial styloid process, and from the motor entry point to the tip of the ulnar styloid process. Both measurements were recorded on all 30 specimens.

AIN branching pattern within the pronator quadratus

Intramuscular branching of the AIN within the PQ was studied in a subset of ten limb specimens where complete intramuscular nerve tracing was achievable. In the remaining twenty specimens, the degree of formalin fixation precluded reliable distal nerve tracing beyond the muscle entry point. The subsample was therefore a convenience sample based on technical feasibility, and the branching pattern findings are reported as preliminary observations only.

Branching patterns were classified according to the description by Svízenská et al.[15] as follows:

- Type A - Gradual branching: the AIN divides progressively into multiple branches as it traverses the muscle.
- Type B - Terminal branching: the AIN divides only at its terminal end within the muscle.
- Type C - Terminal branching with articular continuation: as in Type B, with additional small terminal branches extending to the wrist joint.

Statistical analysis

All continuous data are expressed as mean ± standard deviation (SD) and 95% confidence interval (95% CI). Side-to-side comparisons between right and left limb specimens were performed using Student's independent samples t-test. Prior to each comparison, Levene's test for equality of variances was performed; where Levene's test was significant ($p < 0.05$), Welch's t-test was applied in place of the standard Student's test. As the specimens were disarticulated and could not be attributed to individual donors, right and left specimens were treated as independent (unpaired) groups. A p-value of less than 0.05 was considered statistically significant. Exact p-values are reported throughout. Statistical analysis was performed using SPSS software version 24.0 (IBM Corp., Armonk, NY, USA).

Results

Anterior interosseous nerve motor entry point and length

The motor entry point of the AIN into the PQ muscle was localised from both the radial and ulnar styloid processes in all 30 specimens (15 right, 15 left). The mean distance from the radial styloid process to the motor entry point was 67.95 ± 7.70 mm (95% CI 65.07–70.83 mm) (both sides combined); 67.33 ± 9.18 mm on the right and 68.57 ± 6.15 mm on the left. The mean distance from the ulnar styloid process was 61.43 ± 8.35 mm (95% CI 58.31–64.55 mm) (both sides); 60.86 ± 8.47 mm on the right and 62.00 ± 8.48 mm on the left. No statistically significant side-to-side difference was observed for either measurement (radial styloid: $p = 0.669$; ulnar styloid: $p = 0.715$).

The mean forearm length, measured from the medial epicondyle to the tip of the ulnar styloid process, was 287.27 ± 20.27 mm (95% CI 279.70–294.83 mm) (both sides); 289.27 ± 22.50 mm on the right and 285.27 ± 18.33 mm on the left. No significant side-to-side difference was observed ($p = 0.598$). The motor entry point from the ulnar styloid (61.43 mm) corresponded to 21.4 ± 3.0% of the forearm length, placing the entry point in the distal fifth of the forearm.

The mean length of the AIN, measured from the first FPL branch to PQ entry, was 112.48 ± 5.60 mm (95% CI 110.39–114.57 mm) (both sides); 112.43 ± 5.17 mm on the right and 112.54 ± 6.18 mm on the left, with no significant side difference ($p = 0.957$). All AIN measurements are presented in Table 1.

Table 1
Anterior interosseous nerve (AIN) length, motor entry point distances from bony landmarks, and forearm length (n = 30 specimens)

Parameter	Both sides mean ± SD (95% CI)	Right mean ± SD	Left mean ± SD	p value (R vs L)	Significance
AIN length (FPL branch to PQ entry), mm	112.48 ± 5.60 (110.39–114.57)	112.43 ± 5.17	112.54 ± 6.18	0.957	NS
Motor entry – radial styloid, mm	67.95 ± 7.70 (65.07–70.83)	67.33 ± 9.18	68.57 ± 6.15	0.669	NS
Motor entry – ulnar styloid, mm	61.43 ± 8.35 (58.31–64.55)	60.86 ± 8.47	62.00 ± 8.48	0.715	NS
Forearm length (epicondyle–ulnar styloid), mm	287.27 ± 20.27 (279.70–294.83)	289.27 ± 22.50	285.27 ± 18.33	0.598	NS
Motor entry (ulnar) as % of forearm length	21.4 ± 3.0%	—	—	—	—

R right, L left, FPL flexor pollicis longus, PQ pronator quadratus, NS not significant ($p > 0.05$). 95% CI calculated for the combined sample. Percentage calculated per specimen from individual values. Independent samples t-test used for all comparisons

Intramuscular branching pattern of the anterior interosseous nerve

The intramuscular branching pattern of the AIN within the PQ was examined in a subset of ten limb specimens (see Methods). Patterns were classified according to Svízenská et al.[15] Type A (gradual branching) was the most common pattern, observed in 6 of 10 specimens (60%) (Fig. 2). Type B (terminal branching) was observed in 3 of 10 specimens (30%) (Fig. 3), and Type C (terminal branching with articular continuation) in 1 of 10 specimens (10%) (Fig. 4). These findings are presented in Table 2.

Table 2
Intramuscular branching pattern of the AIN within the pronator quadratus, classified according to Svízenská et al.[15]

Branching pattern	Description	n (of 10)	Frequency (%)
Type A	Gradual branching	6	60
Type B	Terminal branching	3	30
Type C	Terminal branching + articular continuation	1	10

Anterior interosseous artery vascular pedicle length

The mean length of the AIA vascular pedicle was 107.08 ± 4.38 mm (95% CI 105.44 -108.71 mm) (both sides); 106.06 ± 3.71 mm on the right and 108.10 ± 4.87 mm on the left. No statistically significant side-

to-side difference was observed (p = 0.207). These values are presented in Table 3.

Table 3
Anterior interosseous artery (AIA) vascular pedicle length (n = 30 specimens). Values expressed as mean ± SD with 95% CI (mm)

Parameter (mm)	Both sides mean ± SD (95% CI)	Right mean ± SD	Left mean ± SD	p value
AIA vascular pedicle length	107.08 ± 4.38 (105.44–108.71)	106.06 ± 3.71	108.10 ± 4.87	0.207 (NS)

AIA anterior interosseous artery, NS not significant (p > 0.05). Independent samples t-test

Morphometric dimensions of the pronator quadratus

The proximal and distal attachment distances of the PQ from both styloid processes are presented in Table 4. The mean proximal radial extent was 64.10 ± 8.80 mm and the distal radial extent was 17.52 ± 2.25 mm. The proximal ulnar extent was 60.91 ± 7.10 mm and the distal ulnar extent was 15.48 ± 2.49 mm. No statistically significant side-to-side difference was observed for any attachment parameter (proximal radial: p = 0.938; distal radial: p = 0.094; proximal ulnar: p = 0.446; distal ulnar: p = 0.723). For the distal radial extent, Levene's test indicated significantly unequal variances between right and left sides (p = 0.029); Welch's t-test was therefore applied, yielding p = 0.094.

Table 4
Proximal and distal attachment distances of the pronator quadratus from the radial and ulnar styloid processes (n = 30 specimens). Values expressed as mean ± SD with 95% CI (mm)

Parameter (mm)	Both sides mean ± SD (95% CI)	Right mean ± SD	Left mean ± SD	p value	Significance
Proximal radial extent[a]	64.10 ± 8.80 (60.81–67.38)	64.23 ± 9.57	63.97 ± 8.30	0.938	NS
Distal radial extent[a]	17.52 ± 2.25 (16.68–18.37)	18.22 ± 1.43	16.83 ± 2.73	0.094[c]	NS
Proximal ulnar extent[b]	60.91 ± 7.10 (58.26–63.56)	59.90 ± 6.33	61.92 ± 7.89	0.446	NS
Distal ulnar extent[b]	15.48 ± 2.49 (14.55–16.41)	15.65 ± 2.34	15.32 ± 2.71	0.723	NS

NS not significant (p > 0.05). All comparisons by Student's independent samples t-test unless otherwise indicated

[a] Measured from the tip of the radial styloid process

[b] Measured from the tip of the ulnar styloid process

[c] Levene's test indicated unequal variances (p = 0.029); Welch's t-test applied

The mean proximal width of the PQ was 33.53 ± 4.29 mm (95% CI 31.93–35.13 mm) and the mean distal width was 31.52 ± 2.99 mm (95% CI 30.40-32.64 mm) across both sides. No statistically significant side-to-side differences were observed for either width parameter (proximal width: right 32.15 ± 4.02 mm vs. left 34.91 ± 4.23 mm, p = 0.077; distal width: right 30.47 ± 2.51 mm vs. left 32.57 ± 3.14 mm, p = 0.052). Both values approach but do not reach the conventional significance threshold of p < 0.05. These data are summarised in Table 5.

Table 5
Proximal and distal width of the pronator quadratus muscle (n = 30 specimens). Values expressed as mean ± SD with 95% CI (mm)

Parameter (mm)	Both sides mean ± SD (95% CI)	Right mean ± SD	Left mean ± SD	p value	Significance
Proximal width	33.53 ± 4.29 (31.93–35.13)	32.15 ± 4.02	34.91 ± 4.23	0.077	NS
Distal width	31.52 ± 2.99 (30.40–32.64)	30.47 ± 2.51	32.57 ± 3.14	0.052	NS

NS not significant (p > 0.05). Student's independent samples t-test. Width differences approach but do not reach the conventional significance threshold of p < 0.05

Discussion

The deep anatomical position of the PQ makes it challenging to access during electrodiagnostic procedures and volar surgical approaches of the distal forearm. Our study provides cadaveric normative data in the Indian population, which will add to the existing knowledge and data on its morphometry and AIN motor entry point.

AIN motor entry point

Choung et al., in a cadaveric study of 20 forearms from 10 fresh cadavers in a Korean population, measured the AIN entry zone from a vertical reference line passing through the tip of the ulnar styloid process, reporting a median entry zone distance of 30.0 mm (range 15.0–50.0 mm) proximal to this line [3]. The forearm length in their Korean cohort was reported as approximately 240 mm. Additionally, Choung et al. measured the perpendicular distance from a vertical reference line, whereas this study measured straight-line distances directly to the styloid process tip.

Lee and DeLisa described the PQ needle EMG insertion site as approximately 20–30 mm proximal to the ulnar styloid in forearm supination [8]. Perotto et al. described a fingerbreadth-based landmark [12]. Fingerbreadth measurements vary with body habitus, age, and sex [12]. The present data provide a bony-landmark-based alternative referenced from both styloid processes, with the advantage that styloid processes are reliably palpable in the clinical setting.

The motor entry point from the ulnar styloid corresponded to 21.4 ± 3.0% of forearm length, placing it in the distal fifth of the forearm. This proportional guideline partially accounts for variation in limb length across individuals. The SD of 3.0% should be noted; over a forearm of mean length 287 mm, this corresponds to approximately ± 8.6 mm of positional variability. Clinicians should therefore regard this value as a starting point for needle placement, with ultrasound guidance recommended where precise localisation is critical.

The PQ is the key muscle in the electrodiagnosis of anterior interosseous nerve syndrome (AINS), a rare but frequently misdiagnosed condition [9]. Seror, in a consecutive case series of 13 patients with AINS referred for electrodiagnosis, found electrophysiological abnormalities most commonly involving the PQ, with only three patients having received a correct clinical diagnosis prior to referral [14]. Botulinum toxin injection into the PQ for pronator spasticity following stroke or cerebral palsy also requires accurate muscle targeting; inaccurate placement reduces therapeutic efficacy [11, 13].

AIN length

The mean AIN length was 112.48 ± 5.60 mm (95% CI 110.39–114.57 mm). Carlson et al. reported a mean of 122.5 ± 19.3 mm in four fresh cadaver specimens, consistent with the present finding [1]. Hinds et al. reported 38.0 ± 11.0 mm; however, their measurement referred to the length of only the terminal PQ branch of the AIN, not the full segment from the FPL branch point to PQ entry as measured here [4].

Ustün et al. demonstrated the anatomical feasibility of selective AIN-to-ulnar motor branch transfer for restoring motor function in proximal ulnar nerve injuries [16]. The segment potentially available as donor nerve in such transfers lies distal to the last FDP branch and is shorter than the segment measured here.

Intramuscular branching pattern of the anterior interosseous nerve

Using the classification of Svízenská et al.[15] Type A (gradual branching) was the most common pattern in the subsample (6/10, 60%), followed by Type B (3/10, 30%) and Type C with articular continuation (1/10, 10%). Svízenská et al.[15] found an articular branch in 7 of 40 specimens (17.5%); the single Type C specimen here is broadly consistent with this proportion.

The predominance of Type A in this series has surgical relevance. Gradual intramuscular branching means motor branches arborise along the full extent of the muscle belly, so incisions or retraction near the proximal border of the PQ carry greater risk of disrupting motor supply than with terminal branching. Prospective studies with larger numbers and operating microscope dissection are required for definitive characterisation of branching pattern frequencies in the Indian population.

Pronator quadratus morphometry

The mean proximal and distal widths of the PQ were 33.53 ± 4.29 mm and 31.52 ± 2.99 mm respectively. These values are smaller than those reported by Igde et al. (proximal 41.92 ± 2.05 mm, distal 42.84 ± 4.04 mm) in 14 Turkish embalmed cadavers [6] and smaller than the 37.6 mm mean width reported by

Lo and Cheng in a Chinese clinical study [10]. The present values are somewhat lower than the 38.0 ± 5.0 mm reported by Hinds et al.[4] and the 38.0 mm reported by Carlson et al.[1]

No statistically significant side-to-side differences were observed for any morphometric parameter, although both widths showed trends toward left-side predominance that approached the conventional threshold; larger studies may clarify whether a true asymmetry exists. As sex and handedness data were unavailable, the cause of these trends cannot be determined.

Notably, while the forearm length in the present Indian cohort is longer than the approximately 240 mm reported for the Korean cohort of Choung et al.[3] the PQ dimensions here are at the lower end of published ranges. This may reflect genuine population-level differences in limb proportions, whereby South Asian individuals may have proportionally longer forearms relative to muscle mass than Korean or Turkish populations, or in part the effect of formalin fixation, which can cause differential tissue shrinkage. These possibilities cannot be distinguished without matched fresh-tissue or imaging-based data.

Vascular pedicle length and implications for volar surgical approach

The mean AIA pedicle length of 107.08 ± 4.38 mm (95% CI 105.44–108.71 mm) is shorter than the 117.72 ± 7.77 mm reported by Igde et al.[6] and approximately 120 mm reported by Carlson et al.[1] though differences in measurement definitions may account for part of this discrepancy. The low coefficient of variation (4.1%) indicates high inter-specimen consistency. The observed pedicle lengths lie within the range used in published PQ flap studies, although flap feasibility also depends on vessel diameter and flow characteristics, which were not assessed here.

For volar plate fixation of distal radius fractures, the AIN motor entry point at a mean of 61.43 ± 8.35 mm from the ulnar styloid (approximately one-fifth of forearm length) indicates that AIN motor branches may be encountered during PQ elevation in this zone. When gradual branching is present, as seen in the majority of specimens in this study, motor branches may extend further proximally than the entry point alone suggests. Both the motor entry point distance and the dominant branching pattern are therefore relevant when planning the extent of PQ elevation or incision during volar approaches.

Limitations

Several limitations should be acknowledged. The formalin-fixed, disarticulated specimens precluded stratification by sex and age, and fixation-related shrinkage means the measurements are best read as normative approximations rather than absolute in vivo values. The wide standard deviations in motor entry point distances reflect true anatomical variability, so the reported means define a reference zone rather than a precise target. Complete intramuscular nerve tracing was possible in only ten of thirty specimens, making the branching-pattern data preliminary, and skin-to-muscle depth could not be assessed in disarticulated limbs.

Conclusion

This study provides an Indian normative dataset locating the AIN motor entry point from both the radial and ulnar styloid processes. The entry point lay consistently in the distal fifth of the forearm, pronator quadratus dimensions were at the lower end of published ranges with no significant side-to-side asymmetry, and gradual intramuscular branching predominated in the subsample examined. These data may inform electrodiagnostic needle placement, targeted injection, and volar surgical planning at the distal radius, although imaging guidance remains advisable where precise localisation is needed. Prospective studies in living subjects with demographic stratification and ultrasound measurement are required before definitive clinical guidelines can be drawn.

Declarations

Competing interests

The authors declare no potential conflicts of interest relevant to this article.

Ethics approval

The study was performed on cadaveric material obtained through the voluntary body donation programme of the Department of Anatomy, JIPMER, Puducherry, in accordance with the institutional body donation protocol under which informed consent for academic and research, including publication, were obtained from the donor's next to kin prior to donation. The study was exempt from the formal institutional ethics committee review in accordance with the institutional policy.

Consent to participate

The bodies used in this study were received through the institutional voluntary body donation programme with prior written consent, given at the time of donation, permitting their use for medical education and research.

Consent to publish

No identifying information relating to the donors is included in this article, and the donors are not identifiable in any of the figures presented.

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Author Contribution

GR (Gomathi Ramakrishnan), RM (Rituraj Majumder), DKV (Dinesh Kumar V), RV (Raveendranath Veeramani). Protocol/project development: RV, GR. Data collection or management: GR, RM. Data analysis: GR, RM. Manuscript writing/editing: GR, RM, DKV, RV. Other (study supervision): DKV, RV. All authors read and approved the final manuscript.

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Data availability

The complete set of morphometric measurements generated and analysed during this study is not publicly available, but is available from the corresponding author on reasonable request.

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Figures

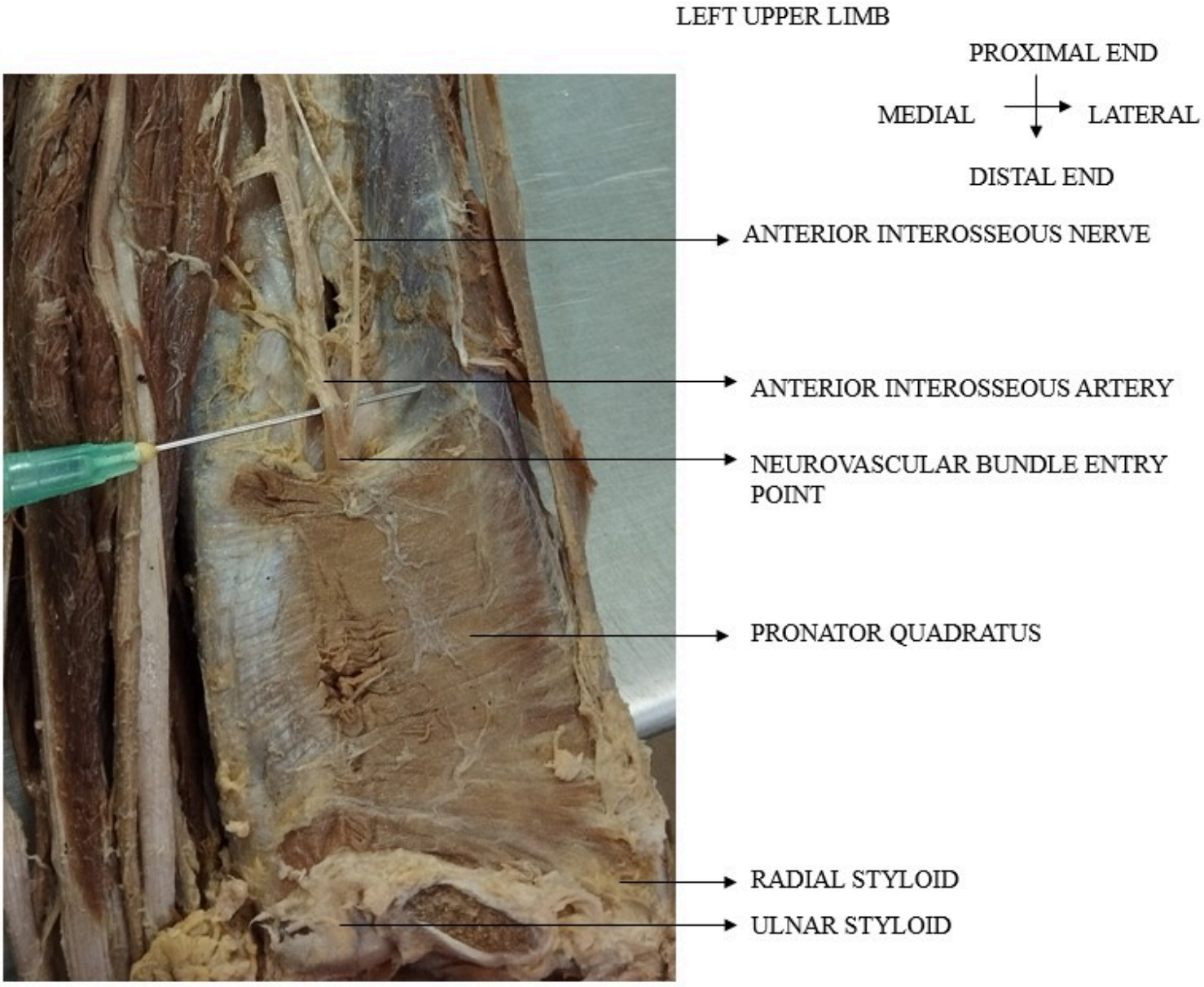


Figure 1

Entry point of neurovascular bundle into pronator quadratus muscle in left upper limb

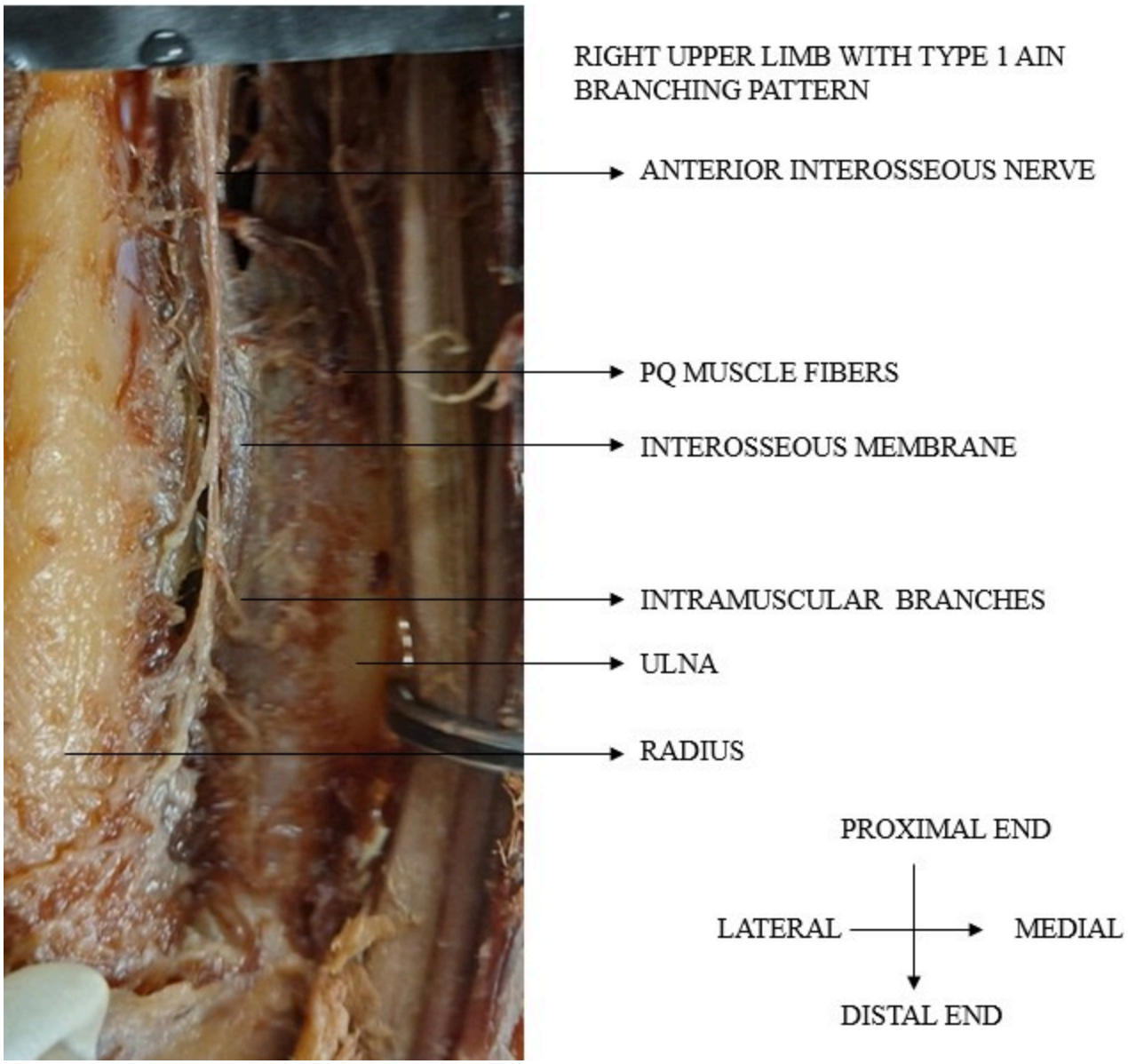


Figure 2

Type A AIN branching pattern in right upper limb (AIN anterior interosseous nerve, PQ pronator quadratus)

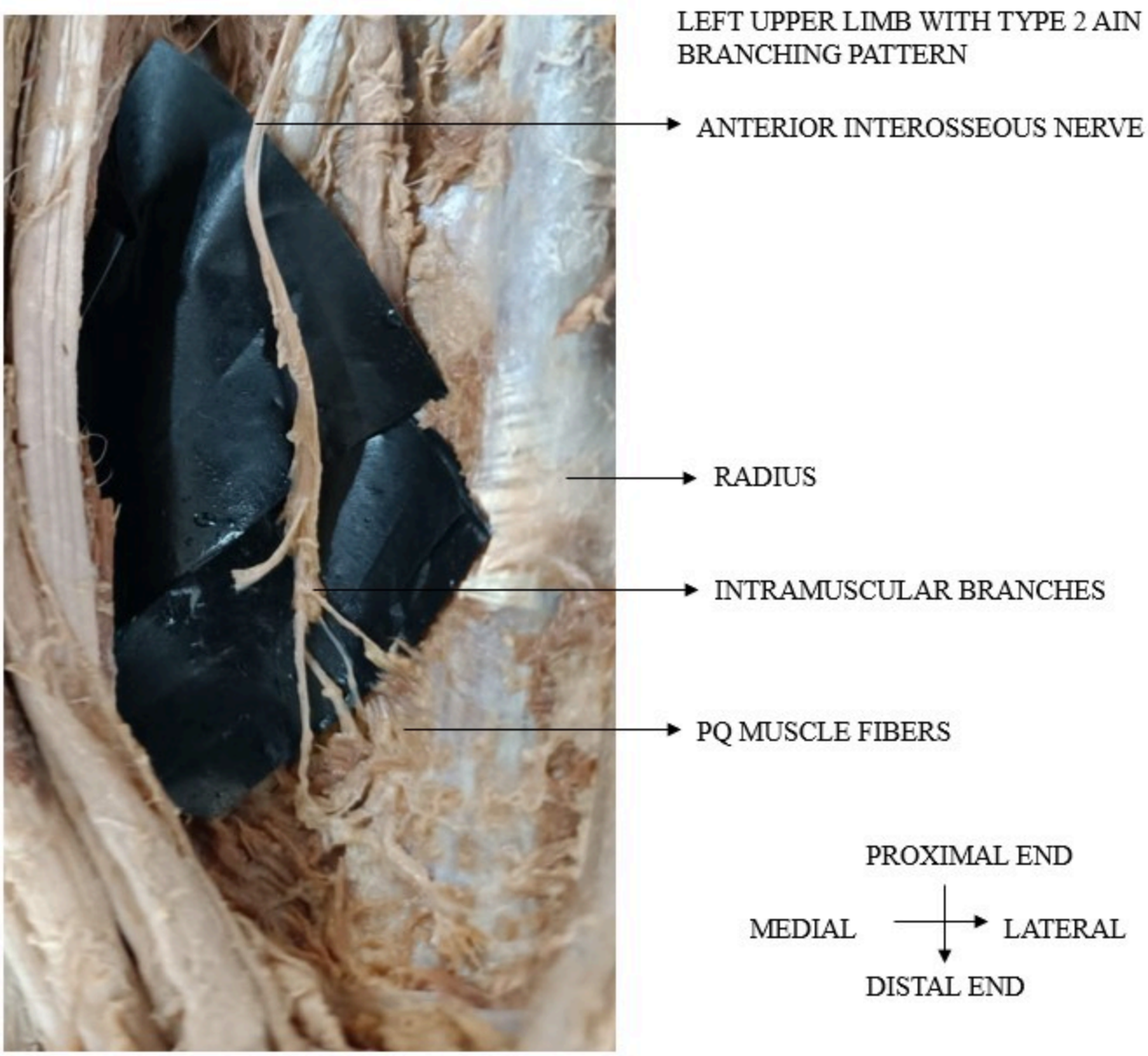


Figure 3

Type B AIN branching pattern in left upper limb (AIN anterior interosseous nerve, PQ pronator quadratus)

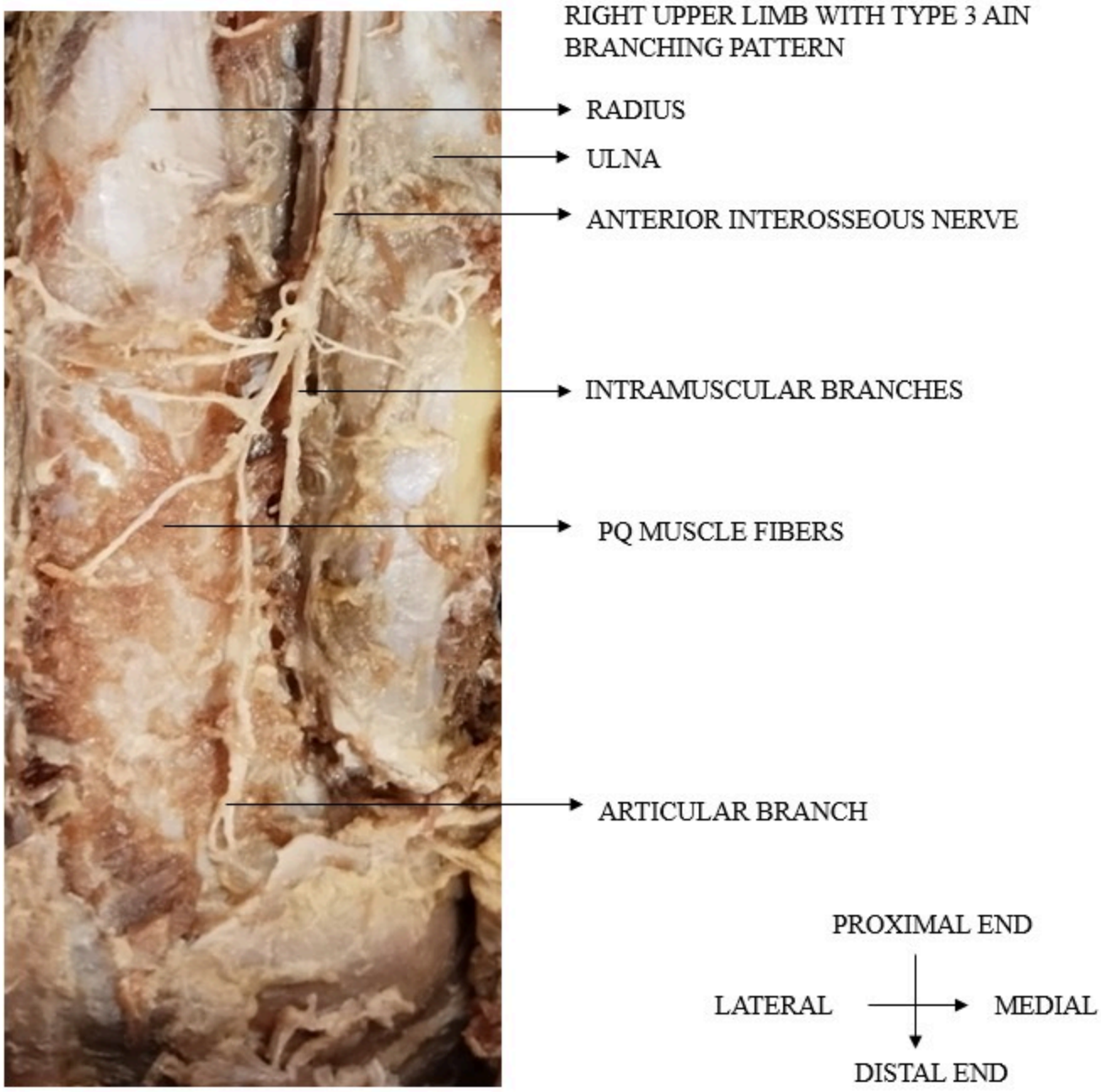


Figure 4

Type C AIN branching pattern in right upper limb (AIN anterior interosseous nerve, PQ pronator quadratus)