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Expect the unexpected: The course of the inferior alveolar artery

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Introduction: The anatomical position of the inferior alveolar artery (IAA) within the mandibular canal and in relation to the substructures of the neurovascular mandibular bundle has been sparsely described to date. More detailed information on the exact IAA position would be beneficial for both dental and maxillofacial surgical procedures to minimize complications such as bleeding, nerve compression hematoma, and sensory deficiency. **Material and methods:** In 31 Thiel-preserved and fresh-frozen cadaver hemimandibles the position of the IAA in relation to the structures of the inferior alveolar neurovascular bundle and the mandible borders was analyzed anatomically and histologically. **Results:** In 77.4% of the cases, rotation of the IAA around the mental nerve was apparent, resulting in a typical site-dependent IAA position. While the IAA was situated buccally within the pterygomandibular space, buccal-inferior in the mandibular foramen, superior in the molar region, and lingually in the pre molar region. In 12.9% of the cases, a persistent lingual position of the IAA was observed for the entire mandibular canal. In one case, an additional mandibular canal and an accessory IAA were identified. **Discussion:** This study provides new and encompassing information on the complete course and position of the IAA. This course is of practical use for oral implantology and various surgical procedures in dental- and maxillofacial surgery. Variations in the typical IAA course and site-dependent positional changes may be referred to as mandible growth and functional adaption to occlusion anomalies. This report helps enhance the morphological and functional understanding of IAA relationship during mandible development