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EXPLAINING THE TOPIC OF HAND AND FOOT BONES TO STUDENTS IN AN EASY WAY

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Annotation: The limb bud first appears in the proximal fetus around the fifth week of development. From this point, various HOX genes govern the growth of the limb. The stylopod, zeugopod, and autopod are the three growth zones of the limb bud corresponding to the humerus, ulna and radius, and hand, respectively. Ectoderm differentiates into the apical ectodermal ridge, non-ridge ectoderm, and zone of polarizing activity. These zones carry essential roles in differentiation. For example, the removal of the apical ectodermal ridge early in limb development will result in the presence of only stylopod development. Removal of the apical ectodermal ridge later in development will result in the formation of the stylopod and zeugopod but no autopod, leading to the fetus not developing a hand.

Key words: Shoulder, upper limb, hand bones.

The HOXA and HOXD genes are responsible for the embryologic development of the hand in humans. HOXA is responsible for anteroposterior growth, while HOXD is responsible for proximodistal growth.

Research has demonstrated that the metacarpal bone length can contribute to the estimation of fetal development during the prenatal period, which may help evaluate any anomalies. Utilizing this in combination with foot lengths and other accepted estimates of development can provide a more comprehensive picture.

Due to the complexity of the structure of the hand, a myriad of morphologic anomalies may occur during development.

Blood supply to the hand comes from the ulnar and radial arteries, which are branches of the brachial artery. Dorsal hand vascular supply comes from the dorsal carpal arch. This arch forms from anastomosis of the dorsal carpal branches of radial and ulnar arteries. Metacarpal branches subsequently arise from the dorsal carpal arch. The first metacarpal branch courses along the radial border of the second metacarpal, supplying the first web space and second metacarpal. The second through fifth branches course along the ulnar borders of the second through fifth metacarpals and provide branches to the interosseous muscles as well as the periosteum.

The superficial palmar arterial arch is primarily formed by the ulnar artery, while the radial artery mainly supplies the deep palmar arterial arch. Metacarpal branches generally arise from the deep arch, while digital arteries arise from the superficial arch. Metacarpal branches form anastomosis with digital arteries.

Physiologic variation of arterial flow in the hand is plentiful, with a multitude of anastomoses and variations in flow dominance.

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Innervation to the hand is from the median, ulnar, and radial nerves. Each digit/ray has two palmar and two dorsal digital nerves. The median nerve innervates the cutaneous volar aspect of the first three and a half digits. The ulnar nerve entirely innervates the dorsal and volar ulnar half of the fourth and fifth digits. The radial nerve innervates the remainder of the dorsal hand. Due to the complex functionality of the hand, it is vital that clinicians reliably report and understand proprioception and grasp strength. Multiple innervation distribution is provided to the MCPs, PIPs, and DIPs to facilitate this understanding. Three volar interossei muscles adduct the second, fourth, and fifth digits about an axis formed by the third digit. These muscles originate on the metacarpal of the digit being adducted and insert onto their respective proximal phalangeal base and extensor hood. Adduction occurring along this third digit axis means that the volar interosseous muscle of the second digit is located on its ulnar border, while the interossei of the fourth and fifth digits reside on their radial borders.

Four dorsal interossei work to abduct the second, third, and fourth digits while assisting with flexion of the MCPs, extension of the PIPs, and extension of the DIPs. The first dorsal interosseous muscle originates from the first and second metacarpals, inserting onto the radial base of the proximal phalanx of the second digit as well as its extensor hood. The second dorsal interosseous muscle originates from the second and third metacarpals, inserting onto the radial base of the proximal phalanx of the third digit as well as its extensor hood. The third dorsal interosseous muscle originates from the third and fourth metacarpals, inserting onto the ulnar base of the proximal phalanx of the third digit as well as its extensor hood. The fourth dorsal interosseous muscle originates from the fourth and fifth metacarpals, inserting onto the ulnar base of the proximal phalanx of the fourth digit as well as its extensor hood.

Abductor pollicis longus (APL) originates in the forearm, at the midshaft of the radial border of the ulna, the ulnar border of the radius, and the interosseous membrane. The muscle inserts to the radial side of the base of the first metacarpal in addition to the trapezium and opponens pollicis fascia.This muscle acts to abduct the first digit.

Abductor pollicis brevis (APB) originates at the trapezium and scaphoid and inserts onto the lateral base of the proximal phalanx of the first digit. This muscle acts in first-digit abduction in addition to MCP flexion.

Extensor pollicis longus (EPL) originates at the radial border of the ulna and interosseous membrane, distal to the origin of APL. EPL inserts to the base of the distal phalanx and acts to extend the interphalangeal joint.

Extensor pollicis brevis (EPB) originates at the ulnar border of the radius and interosseous membrane at the level of EPL. This muscle inserts to the base of the proximal phalanx of the first digit and aids in the first digit extension at the MCP.

Opponens pollicis acts to pronate the first metacarpal; it originates at the trapezium and inserts onto the anterolateral aspect of the first metacarpal.

Flexor carpi radialis (FCR) originates at the medial humeral epicondyle and inserts onto the trapezium, second metacarpal, and third metacarpal. FCR acts to flex and radially deviate the

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wrist.

Flexor pollicis brevis (FPB) has a deep and superficial head. The deep head originates at the second metacarpal, while the superficial head originates at the transverse carpal ligament and trapezium. These insert onto the lateral base of the proximal phalanx of the first digit and act to flex the MCP.

Flexor pollicis longus (FPL) is the primary flexor of the first digit, originating from the volar interosseous membrane and radius. The muscle inserts onto the base of the distal phalanx.

The Adductor pollicis has two heads, an oblique and transverse. The oblique head originates at the capitate, second, and third metacarpals. The transverse head originates at the distal half of the third metacarpal shaft. These both insert onto the medial base of the thumb proximal phalanx and act to adduct the first digit.

Abductor digiti minimi (ADM) acts to abduct the fifth digit and has been found to originate at the pisiform, piso-hamate ligament, and flexor carpi ulnaris. The muscle inserts onto the ulnar aspect of the proximal phalangeal base and extensor apparatus of the fifth digit.

Flexor digiti minimi (FDM) originates from the hamate, pisiform, and flexor retinaculum. Distally, the flexor digiti minimi fuse with the ADM to insert onto the proximal phalangeal base of the fifth digit, leading to its action of MCP flexion.

Extensor carpi ulnaris originates at the lateral humeral epicondyle and inserts onto the dorsal base of the fifth metacarpal, acting in wrist extension and ulnar deviation.

Flexor digitorum superficialis (FDS) has a broad origination from the medial epicondyle of the humerus and coronoid process of the ulna to the volar aspect of the radial shaft. The muscle then inserts onto the middle phalangeal bases of the second through fifth digits. This acts primarily in PIP flexion.

Flexor digitorum profundus (FDP) originates from the volar-medial aspect of the ulna and interosseous membrane and inserts at the distal phalangeal bases of the second through fifth digits. This performs DIP flexion.

Extensor digitorum communis (central slip and terminal tendons) originates at the lateral epicondyle of the humerus and inserts at the dorsal aspect of the distal phalangeal base of the second through fifth digits. There is significant anatomic variation in the accessory slips and insertions of this muscle, but the classic teaching is that there is an insertion to the middle phalanx and MCP in addition to this consistently present terminal insertion.

Literature:

1. Salomov, S., Aliyev, H. M., & Rakhmanov, R. R. (2022). MORPHOMETRIC INDICATORS OF THE GROWTH OF THE THICKNESS OF THE LAYERS OF THE VISUAL CORTEX (FIELD 17, 18, and 19) OF THE LEFT AND RIGHT HEMISPHERES OF THE BRAIN IN A HUMAN IN POST-NATAL

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ONTOGENESIS. *Galaxy International Interdisciplinary Research Journal*, *10*(1), 875-878.

2. Izbosarovna, O. M. (2022). FLOWERING PLANTS USED IN LANDSCAPING WORK. *British Journal of Global Ecology and Sustainable Development*, *10*, 184-190.
3. Izbosarovna, O. M. (2022). CARE AND FEEDING OF CARP FISH. *British Journal of Global Ecology and Sustainable Development*, *10*, 108-113.
4. Ачилова, З. (2023). Словообразовательные и грамматические трудности при переводе испанского текста на русский. *Центральноазиатский журнал образования и инноваций*, *2*(6 Part 6), 220-224.
5. Ачилова, З. П. МЕТОДЫ ОБУЧЕНИЯ ПРИ ПЕРЕВОДЕ ПОЛИТИЧЕСКИХ ВЫСТУПЛЕНИЙ Эргашев Алишер Фарход угли.
6. Nozimjon o‘g, S. S., & Mahramovich, K. S. (2024). The Chemical Composition Of The White Carrak Plant And Its Medicinal Role. *Texas Journal of Medical Science*, *29*, 78-80.
7. АЧИЛОВА, З. LAS PARTICULARIDADES DE LA COMPETENCIA COMUNICATIVA DE LOS ESTUDIANTES.
8. Nozimjon o’g’li, S. S., & Makhmudovich, A. H. (2024). The Most Effective Drugs in the Treatment of Myocarditis Disease. *Health & Medical Sciences*, *1*(2), 6-6.