

Supplementary Table 1: Facial and neck muscles of trisomy-18 fetus

Name of Facial Muscles	Descriptions
Frontalis	Continuous thin layer of longitudinal muscle fibers that extends superiorly from orbicularis oculi and laterally to medial 2/3 of eye
Orbicularis oculi	Continuous circular muscle around eyes; fuses with neighboring muscles
Nasalis	Thin layer that extends laterally from midline of nose
Orbicularis oris	Circular muscle around mouth; fuses with neighboring muscles
Zygomaticus minor, Levator labii superioris, Levator labii superioris alaeque nasi, Levator anguli oris, Zygomaticus major	Triangular sheet of muscle fibers (designated here as "complex triangle") that extends superiorly and laterally from upper lip to zygomatic arch, inferior border of orbicularis oculi, and nose
Risorius	Muscle band that extends laterally from corner of mouth, inferior to parotid gland
Temporalis	Fan-shaped muscle sheet that extends from temporal bone, passes deep to zygomatic arch and attaches to mandible
Masseter	Well-developed muscle mass that extends from zygomatic arch to ramus of mandible
Buccinator	Rectangular muscle mass that extends laterally from upper lip, corner of mouth, and lower lip and passes deep to masseter
Mentalis and depressor labii inferioris	Blended muscle fibers that extend inferiorly from lower lip
Depressor anguli oris	Muscle fibers that extend inferiorly from corner of mouth
Name of Neck Muscles	Descriptions
Sternocleidomastoid	Two fused heads that attach distally to manubrium of sternum and superior border of medial 1/3 of clavicle and proximally to mastoid process and superior nuchal line
Sternohyoid	Thin sheet of muscle band that extends from manubrium of sternum to body of hyoid bone
Omohyoid	Thin muscular band with central tendon that attaches distally to superior border of scapula and distally to body of hyoid bone; left omohyoid has extra head that lies lateral to normal head and attaches to greater horn of hyoid bone
Sternothyroid	Thin sheet of muscle band that extends from manubrium of sternum to thyroid gland
Thyrohyoid	Small rectangular muscle sheet that extends from thyroid gland to hyoid bone
Anterior belly of digastric	Extends posteriorly from digastric fossa of mandible to intermediate tendon of digastric at hyoid bone
Posterior belly of digastric	Extends inferiorly and anteriorly from styloid process to intermediate tendon of digastric at hyoid bone
Mylohyoid	Thin broad muscular sheet that extends medially from inner border of mandible to superior border of hyoid bone

Geniohyoid	Extends between two sublingual glands from inner middle side of mandible to hyoid bone
Genioglossus	Fan-shaped muscle that extends from mandible to hyoid bone and tongue
Hyoglossus	Two thin muscle sheets that extends superiorly from hyoid bone to lateral sides of tongue
Styloglossus	Cylindrical muscle that extends from styloid process to lateral sides of tongue
Palatoglossal and palatopharyngeal	Palatoglossal and palatopharyngeal arches that extends from palate to lateral sides of tongue and pharynx, respectively, with palatine tonsil in between
Inferior pharyngeal constrictor	Fan shaped muscle that extends from thyroid and cricoid cartilages to the pharyngeal raphe
Middle pharyngeal constrictor	Fan shaped muscle that extends from hyoid bone to the pharyngeal raphe
Anterior scalene	Longitudinal muscle that lies medial to brachial plexus; extends from transverse processes of cervical vertebrae to 1 st and 2 nd ribs
Middle scalene	Longitudinal muscle that lies lateral to brachial plexus; extends from transverse processes of cervical vertebrae to 1 st rib
Posterior scalene	Longitudinal muscle that lies lateral and posterior to middle scalene; extends from transverse processes of cervical vertebrae to 2 nd rib
Cricothyroid	Small triangular muscles that extends from cricoid cartilage to inferolateral border of thyroid cartilage
Posterior cricoarytenoid	Small triangular muscles that extends from cricoid cartilage to arytenoid cartilage
Arytenoid muscle	Transverse muscle fibers that were observed on posterior wall of arytenoid cartilages

Supplementary Table 2: Muscles of chest, back, and upper extremities of trisomy-18 fetus (right and left sides)

Muscle	Origin	Insertion	Notes (bilaterally, if not otherwise mentioned)
Trapezius	External occipital protuberance; superior nuchal line of occipital bone; spinous processes of cervical, thoracic, and first two lumbrical vertebrae	Lateral third of clavicle; acromion process and spine of scapula	
Rhomboid major and minor	Spinous processes of C7 to T5	Lateral border and inferior angle of scapula	
Levator scapulae	Superior angle of scapula	Transverse processes of cervical vertebrae	
Serratus anterior	Outer surface of upper 8	Costal aspect of	

	ribs	medial border of scapula	
Supraspinatus	Supraspinous fossa of scapula	Superior facet on greater tubercle of humerus	
Infraspinatus and teres minor	Infraspinous fossa and lateral border of scapula	Middle and inferior facets on greater tubercle of humerus	Completely fused with each other
Teres major	Inferior angle and lateral border of scapula, inferior to fused infraspinous and teres minor	Medial lip of intertubercular sulcus of humerus	
Latissimus dorsi	Spinous processes of thoracic (T10) and lumbar vertebrae, thoracolumbar fascia, iliac crest	Crest of lesser tubercle of humerus	Presence of Langer's axillary arch between latissimus dorsi and pectoralis major on left side only
Pectoralis major	Clavicle, sternum and costal cartilage of ribs 1-6	Crest of greater tubercle of humerus	1. Presence of abdominal part on right side only 2. Presence of Langer's axillary arch between latissimus dorsi and pectoralis major on left side only
Pectoralis minor	Ribs 3-6	Coracoid process of scapula; fascia of coracobrachialis on right side only	Insertion of right pectoralis minor extends inferiorly to fascia of coracobrachialis
Deltoid	Lateral third of clavicle; acromion process and spine of scapula	Deltoid tuberosity of humerus	Fused with pectoralis major (Deltopectoral complex)
Biceps brachii	Short head: coracoid process Long head: supraglenoid tubercle of shoulder joint	Radial tuberosity of radius	1. Fusion between proximal ends of biceps short head and coracobrachialis 2. Fusion between fascia of inner side of pectoralis major and short head of biceps
Coracobrachialis	Coracoid process	Medial side of midshaft of humerus	Its proximal end fuses with proximal end of short head of biceps brachii
Brachialis	Anterior surface of inferior 2/3 of humerus	Ulnar tuberosity of ulnar	
Triceps brachii	<u>Long head</u> : infraglenoid tubercle of scapula	Olecranon process of ulna	

	<u>Lateral head</u> : posterior surface of humerus <u>Medial head</u> : posterior surface of humerus		
Pronator teres	Medial epicondyle	Lateral side of midshaft of radius	Fusion between proximal ends of pronator teres and flexor carpi radialis
Flexor carpi radialis	Medial epicondyle	Trapezoid and base of metacarpal 2	Fusion between proximal ends of pronator teres, flexor carpi radialis and flexor digitorum superficialis
Palmaris longus	Medial epicondyle	Palmar aponeurosis	Absent on right side only
Flexor carpi ulnaris	Medial epicondyle and shaft of ulna	Pisiform	Muscles fibers extend distally along entire length of tendon
Flexor digitorum superficialis	Medial epicondyle	Two sides of middle phalanges of digits 2, 3 and 4 only	<ol style="list-style-type: none"> 1. Fusion between proximal ends of flexor carpi radialis and flexor digitorum superficialis 2. Absent tendon to digit 5
Flexor digitorum profundus	Medial and anterolateral aspect of ulna; interosseous membrane	Palmer surface of distal phalanges of digits 2-5	<ol style="list-style-type: none"> 1. Tendon to distal phalanx of digit 5 sends small tendon to middle phalanx 2. Tendons split more proximal than normal on left side 3. Two bellies fused proximally on right side, medial belly sends tendon to 2nd digit and lateral belly sends 3 tendons to medial 3 digits 3. Fusion between proximal 2/3 of flexor pollicis longus and lateral belly (tendon to 2nd digit) of flexor digitorum profundus
Flexor pollicis longus	Anterior aspect of middle 1/3 of radius; interosseous membrane	Proximal ends of proximal and distal phalanges of thumb	Fusion between proximal 2/3 of flexor pollicis longus and lateral belly (tendon to 2 nd digit) of flexor digitorum profundus
Pronator quadratus	Distal anterior aspect of ulna	Distal anterior aspect of radius	
Brachioradialis	Lateral supraepicondylar	Distal end of radius	Very thin

	ridge of humerus		
Extensor carpi radialis longus	Lateral supraepicondylar ridge of humerus, inferior to Brachioradialis	Dorsal side of base of second metacarpal bone	Fused proximally
Extensor carpi radialis brevis	Lateral epicondyle	Dorsal side of base of third metacarpal bone	
Extensor digitorum	Lateral epicondyle	Distal phalanges of digits 2-5	
Extensor digiti minimi	Lateral epicondyle	Distal phalanx of digit 5	
Extensor carpi ulnaris	Lateral epicondyle	Base of 5 th metacarpal bone	
Abductor pollicis longus	Posterior shaft of radius	Base of 1 st metacarpal bone	
Extensor pollicis brevis	Posterior shaft of radius	Base of proximal phalanx of 1 st digit	Fuses proximally with abductor pollicis longus
Extensor pollicis longus	Posterior surface of ulna and interosseous membrane	Base of distal phalanx of 1 st digit	
Extensor indicis	Posterior surface of ulna	Joined tendon of extensor digitorum to digit 2	
Anconeus	Lateral epicondyle of humerus	Olecranon and surface of ulna	
Supinator	Ulna	Superior lateral surface of radius	
Lumbricals (4)	Tendons of flexor digitorum profundus	Extensor expansions of digits 2-5	Very soft and small (under-developed)
Adductor pollicis	Transverse: metacarpal 2-4 Oblique: bases of metacarpals 3 and 4	Base of proximal phalanx of thumb	
Abductor pollicis brevis	Flexor retinaculum	Base of proximal phalanx of thumb	
Opponens pollicis	Trapezium and base of 1 st metacarpal	Base of proximal phalanx of thumb	
Flexor pollicis brevis	Trapezium	Base of proximal phalanx of thumb	
Muscle of Henle	Base of 1 st metacarpal	Base of proximal phalanx of thumb	Small muscle deep to tendon of flexor pollicis longus observed on right side only
Abductor digiti minimi	Pisiform	Lateral aspect of base of proximal phalanx of 5 th digit	
Opponens digiti minimi	Hamate and flexor retinaculum	Anterolateral aspect of distal end of 5 th metacarpal	

Flexor digiti minimi	Hamate and flexor retinaculum, on top of opponens digiti minimi	Proximal phalanx of 5 th digit	
Palmar interosseous	Sides of metacarpals 3, 4 and 5	Base of proximal phalanges of digits 2, 4 and 5	
Dorsal interosseous	Sides of metacarpals	Base of proximal phalanges of digits 2, 3 and 4	

Supplementary Table 3: Muscles of hip and lower extremities of trisomy 18 fetus (right and left sides)

Muscle	Origin	Insertion	Notes (bilaterally, if not otherwise mentioned)
Gluteus maximus	Iliac crest and lateral crest of sacrum	Gluteal tuberosity of femur and iliotibial tract at level of greater trochanter	
Gluteus medius	Iliac crest between posterior and anterior gluteal lines	Greater trochanter of femur	Fused anteriorly with tensor fasciae latae
Gluteus minimus	Dorsum of ilium between anterior and inferior gluteal lines	Greater trochanter of femur	
Piriformis	Lateral surface of sacrum	Superior border of greater trochanter	
Superior gemellus	Ischial spine	Superior border of greater trochanter and trochanteric fossa	Fusion between lateral ends
Obturator internus	Inner surface of obturator foramen	Superior border of greater trochanter and trochanteric fossa	
Inferior gemellus	Ischial tuberosity	Superior border of greater trochanter and trochanteric fossa	
Obturator externus	Obturator foramen and obturator membrane	Posteromedial surface of greater trochanter	
Quadratus femoris	Anterolateral surface of ischial tuberosity	Intertrochanteric crest	
Sartorius	Anterior superior iliac spine	Anteromedial surface of tibia, medial to tibial tuberosity	
Rectus femoris	Anterior inferior iliac spine	Quadriceps tendons attach to patella then patellar ligament attach to tibial tuberosity	
Vastus lateralis	Greater trochanter and shaft of femur		
Vastus medialis	Posterior-medial surface of femur on linea aspera		
Vastus intermedius	Anterolateral surface of femur		
Tensor fasciae latae	Anterior superior iliac spine	Iliotibial tract	Fusion with gluteus medius

Pectineus	Superior ramus of pubis	Pectineal line on posterior surface of femur, inferior to lesser trochanter	
Adductor longus	Superior ramus of pubis	Posterior mid-shaft of femur	
Adductor brevis	Inferior ramus of pubis	Posterior mid-shaft of femur	
Adductor magnus	Inferior ramus of pubis and ischial tuberosity	Posterior mid-shaft of femur and adductor tubercle of femur	
Gracilis	Inferior ramus of pubis	Medial surface of tibia	
Biceps	Long head: ischial tuberosity Short head: posterior-lateral mid-shaft of femur	Lateral aspect of head of fibula	
Semitendinosus	Ischial tuberosity	Anteromedial aspect of tibia, medial to tibial tuberosity	
Semimembranosus	Ischial tuberosity	Posterior surface of medial epicondyle of tibia	
Tibialis anterior	Lateral surface of shaft of tibia	Base of 1 st metatarsal	
Extensor digitorum longus	Superior part of anterior surface of fibula	Dorsal surface of middle and distal phalanges of lateral four toes	
Extensor hallucis longus	Anteromedial shaft of fibula and interosseous membrane	Base of distal phalanx of big toe	
Fibularis tertius	Inferior part of anterior surface of fibula	Medial side of base of 5 th metatarsal	Proximal part has common fibers with extensor digitorum longus (normal)
Fibularis longus	Lateral side of shaft of fibula (superior)	Inferior surface of base of 1 st metatarsal and medial cuneiform bone	Fusion of proximal 2/3
Fibularis brevis	Lateral side of shaft of fibula (inferior)	Base of 5 th metatarsal	

Gastrocnemius	Femoral condyles	Calcaneus by calcaneal tendon	
Soleus	Soleus line of tibia and head of fibula	Calcaneus by calcaneal tendon	
Plantaris	Lateral supracondylar line of femur superior to lateral head of gastrocnemius	By long tendon passes between gastrocnemius and soleus then join calcaneal tendon	
Tibialis posterior	Tibia, fibula, and interosseous membrane	Navicular bone	
Flexor digitorum longus	Posterior surface of tibia	Distal phalanges of toes 2-5	
Flexor hallucis longus	Posterior surface of fibula	Base of distal phalanx of big toe	
Flexor digitorum brevis	Calcaneus	3 tendons split and attach to middle phalanges of toes 2-4 only	No tendon to toe 5
Abductor hallucis	Medial side of calcaneal tuberosity	Medial side of base of proximal phalanx of big toe	Fusion between abductor hallucis and medial head of flexor hallucis brevis
Abductor digiti minimi	Lateral side of calcaneal tuberosity	Lateral side of base of proximal phalanx of 5 th toe	
Lumbrical	Tendons of flexor digitorum longus	Extensor expansion of lateral 4 toes	
Quadratus plantae	Calcaneus	Common tendon of flexor digitorum longus	
Adductor hallucis	Transverse head: metacarpophalangeal ligaments of lateral 3 toes Oblique head: cuneiform bones	Lateral side of base of proximal phalanx of big toe	
Flexor hallucis brevis	Lateral cuneiform	Base of proximal phalanx of big toe	Fusion between medial head of flexor hallucis brevis and abductor hallucis
Flexor digiti minimi	Base of 5 th metatarsal	Base of proximal phalanx of toe 5	
Dorsal interosseous	Adjacent sides of	Base of proximal	

	metatarsal 1-5	phalanges of toes 2-4	
Plantar interosseous	Medial sides of metatarsal 3-5	Base of proximal phalanges of toes 3-5	
Extensor digitorum brevis	Calcaneus	Extensor expansion of 2 nd , 3 rd and 4 th toes	Presence of small muscle lateral to extensor digitorum brevis, originates from cuboid and sends tendon to 5 th toe on right side only
Extensor hallucis brevis	Calcaneus	Extensor expansion of big toe	Fuses proximally with extensor digitorum brevis