The List of **plastinated specimens** for medical teaching

Anatomy of the 21st Century

Anatomy is an old science which researches body's form and structure by means of modern scientific methods and technology. Its task is to illustrate the figure, structure, position, abutted relationship of organs, and the rules of their generation and development. Anatomy is closely related to other medical subjects, which is an important constituent of medical curriculum. It's not only the basis of medical fundamental courses, but also the basis of medical clinical courses. After entering into the new century, although there is no obvious change of basic contents, the hours applying to the teaching of anatomy has been reduced obviously. In many medical universities, time of instruction in anatomy that medical students received has been reduced at least more than one-half contrasting against the 1980's. The appearance of this status, to a great extent, attributes to the hard of teaching circumstance and the shortage of anatomic teachers. On the contrast, the appearance and continual development of ultrasonography, computerized tomography and interventional radiology brought forward new projects and developmental orientation for anatomy, which require an even more detailed and comprehensive knowledge of anatomy.

The conflict of "supply and requirement" in the anatomical teaching is becoming the bottle-neck which restricts the development of medical teaching. An advanced biotic preservation technique that may resolve this conflict effectively is the use of …

…plastinated anatomical teaching specimens.

What Is the Plastination?

The cadavers will decompose soon without any embalmment, which hinders the development and popularization of the anatomy seriously. In order to reserve the cadavers, all kinds of ways were considered. For example, the cadavers were made into mummies with flavors and medicines by ancient Egyptians before B.C.2500. In China, ice, wax, arsenic and mercury were used to reserve the cadavers of the monarchs of the ancient empires. However, the problem of long preservation of the cadavers has not been resolved until Hoffmann, the Germanic chemist, invented the formalin (35% formaldehyde solution) as embalming fluid to preserve the cadavers in 1867.

Although the formalin has good embalming quality, it's a carcinogen with irritative odor. The specimens must be displayed in containers with formalin which is inconvenience for being used. The specimens' color is pale and becomes black when contacting air. This terrible appearance enhances the repugnance of the public. These problems and the taboo for death induce the status that the human anatomy deviates from the people and is difficult to be popularized. Till the appearance of plastination technology in 1978, the problem puzzled the anatomical field hundreds years was resolved, which began a new technologic revolution in the anatomical history.

Plastination is a special technique which can preserve the cadavers vividly. In this technique, the water and fat of the tissue are exchanged with the high-molecular polymers, such as silicone rubber, epoxy resins and polyester resins. The plastinated specimens are dry, odorless, durable, long-preserved and easy for study. The subtle structures of tissues and cells are identical with their original conditions. Because of the high value of plastinated specimens in education, research and science popularization, the plastination has been used broadly in many subjects and fields such as anatomy, biology, histology, embryology, pathology, medical jurisprudence, archaeology, etc. More than 400 institutes in 40 countries began to reserve cadavers with this preservation technique all over the world.

From 1996, the plastination technique has been applied in medical science popularization and exhibitions widely. Because the specimens are displayed vividly, the terror of the people disappears. The invention of the plastination technique created a new path for medical science popularization, which made the human specimens walk out of the laboratories of medical university and display to the public.

For any specimens that were not listed in this brochure, please do not hesitate to inquire us.

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Plastinated specimens Ⅰ: Silicone specimens

Whole-body specimens

Body One: Joints and Ligaments Specimen

Art-No: STW001

Synopsis: Due to the limit of time and anatomical skills, the delicate dissection of all the joints and ligaments is unavailable in anatomical teaching class. Therefore, the teaching specimens are necessary for the students to understand and remember. This specimen displays the skeleton, joints and ligaments. Around the joints, some deep muscles are remained so that the origins are clear, which will be helpful for the students to understand the role of the muscles during movement.

Displaying contents:

The joints of skull:

1. Sutures : lambdoid suture, coronal suture and sagittal suture
2. Temporomandibular joint: The left articular capsule is integrated and the lateral ligament is remained. The right articular capsule is sagittally cut to display the articular disc and cavity.

The joints of the trunk bones:

1. The joints of vertebrae: anterior longitudinal ligament, yellow ligament, interspinal ligament, superaspinal ligament (ligamentum nuchae), intertransverse ligament, anterior and posterior atlatooccipital membranes. One vertebral body is partly removed to display intervertebral disc (mucleus pulposus and annulus fibrosus).
2. Thoracic joints: The sternum is cut coronally to display the sternocostal joints and sternoclavicular joint (articular disc) on right side. On the other side, intercostals externi, intercostals interni, levator scapulae, longus capitis, longus colli, scalenus anterior, medius and posterior are displayed.

The joints of the bones of limbs

1. The joints of the upper limbs:

Name	Left	Right
Sternoclavicular joint	1. intact articular capsule 2. anterior and posterior 3. sternoclavicular ligaments 4. interclavicular ligament 5. costoclavicular ligament	articular disc
Acromioclavicular joint	1. intact articular capsule 2. acromioclavicular ligament 3. coracoclavicular ligament 4. transverse suprascapular ligament	
Shoulder joint	1. intact articular capsule 2. coracoacromial ligament 3. coracohumeral ligament 4. the tendon of the biceps brachii's long head	1. the articular capsule with a window on the anterior wall 2. the direction of the tendon of the biceps brachii's long head 3. articular labrum
Elbow joint	1. intact articular capsule 2. radial collateral ligament 3. ulnar collateral ligament 4. annular ligament of radius 5. the tendon of the biceps brachii and chorda obliqua	1. without articular capsule 2. radial collateral ligament 3. ulnar collateral ligament 4. annular ligament of radius
Forearm	1. interosseous membrane of forearm 2. pronator quadratus 3. pronator teres 4. the tendons of flexor carpi radialis 5. the tendons od extensor carpi ulnaris	interosseous membrane of forearm
Wrist joint	1. intact articular capsule 2. ligaments around the joint	1. transver secarpal ligament 2. the dorsum of the hand is coronally cut to display the articular disc, distal radioulnar joint and intercarpal joints.
The other joints of hand	1. intact articular capsules 2. ligaments around the joints 3. interossei and lumbricales	open articular capsules

2. The joints of the lower limbs:

Pelvic ligaments: iliolumbar ligament, dorsal and ventral sacroiliac ligaments, pectineous ligament, sacrotuberous ligament, sacrospinous ligament and pubic symphysis.

Name	Left	Right
Hip joint	1. intact articular capsule 2. iliofemoral ligament	1. opened articular capsule 2. acetabular labrum

	3. pubofemoral ligament 4. ischiofemoral ligament	3. transverse acetabular ligament 4. orbicular zona
Knee joint	1. intact articular capsule 2. tibial collateral ligament 3. fibular collateral ligament 4. patellar ligament 5. popliteal oblique ligament 6. iliotibial track 7. tendons of semitendinosus, semimembranosus, gracilis femoris and sartorius	1. opened articular capsule 2. medial and lateral meniscuses 3. anterior and posterior cruciate ligaments 4. transverse ligament of knee
Leg	1. tendons of tibialis anterior, tibialis posterior, extensor digitorum, peroneus longus and peroneus brevis 2. crural interosseous membrane 3. tendo calcaneus (10cm)	1.crural interosseous membrane 2.tendo calcaneus (10cm)
Ankle joint	1. intact articular capsule 2. medial ligament/deltoid 3. ligament 4. anterior and posterior 5. talofibular ligaments 6. calcaneofibular 7. ligament	opened articular capsule
The other joints of foot	1. intact articular capsules 2. ligaments around the joints 3. interossei	1. horizontal cut of the 2. dorsum of foot to display intertarsal joints and tarsometatarsal joints 3. 2.opened articular capsules of metatarsophalangeal joints and interphalangeal joints

Body Two: Muscular Specimen

Art-No. : STW002

Synopsis: Skeletal muscle is an important portion of locomotive system and is also the emphases of teaching. After delicately dissected, the specimen displays the skeletal muscles of the whole body and some cutaneous nerves and superficial arteries which are remained simultaneously. One side of the specimen displays superficial layer muscles, and the other side displays deep layer muscles. By means of the contrast between the two sides, students can deeply understand and grasp the positions and relationship of the muscles.

Displaying contents:

Position	Left (superficial layer)	Right (deep layer)
Facial muscles	1. orbicularis oculi 2. occipitofrontalis(frontal belly, occipital belly and galea aponeurotica) 3. orbicularis oris	1. buccinator 2. ocular muscles

Masticatory muscles	1. masseter 2. temporalis	1. Part of mandible is removed. 2. medial pterygoid 3. lateral pterygoid
Muscles of neck	1.platysma	1. sternocleidomastoid 2. suprahyoid and infrahyoid muscles (digastric, mylohyoid, mylohyoid, sternothyroid, sternohyoid, omohyoid and so on)
Muscles of thorax and abdomen	1. pectoralis major 2. serratus anterior 3. obliquus externus abdomen 4. superficial inguinal ring 5. spermatic cord 6. testis 7. penis 8. suspensory ligament of penis 9. anterior layer of sheath of rectus abdominis	1. subclavius 2. pectoralis minor 3. obliquus internus abdominis 4. transverses abdominis 5. rectus abdominis 6. posterior layer of sheath of rectus abdominis 7. arcuate line 8. pyramdidalis 9. deep inguinal ring
Muscles of back	1. trapezius 2. latissimus dorsi 3. thoracolumbar fascia 4. lumbar triangle 5. auscultation triangle	1. rhomboideus major 2. rhomboideus minor 3. erector spinae(spinalis, longissimus and iliocostalis) 4. levator scapulae 5. serratus posterior superior 6. serratus posteriorm inferior 7. splenius capitis 8. splenius cervicis 9. semisplenius capitis
Muscles of shoulder	1. deltoid 2. teres major 3. teres minor	1. supraspinatus 2. infraspinatus
Muscles of arm	1. biceps brachii and it's aponeurosis 2. triceps brachii	1. brachialis 2. coracobrachialis 3. tendon of long head of biceps brachii
Anterior group of forearm	1. brachioradialis 2. pronator teres 3. flexor carpi radialis 4. palmaris longus 5. flexor carpi ulnaris 6. flexor digitorum superficialis 7. palmar ligament of wrist	1. flexor digitorum profundus 2. flexor pollicis longus 3. pronator quadratus
Posterior group of forearm	1. anconeus 2. extensor carpi radialis brevis 3. extensor carpi radialis longus 4. extensor digitorum 5. extensor digiti minimi 6. extensor carpi ulnaris 7. retinaculum extensorum	1. supinator 2. abductor pollicis longus 3. extensor pollicis brevis 4. extensor pollicis longus 5. extensor indicis
Muscles of hand	1. palmar aponeurosis 2. retinaculum flexorum 3. abductor pollicis brevis 4. flexor pollicis brevis 5. lumbricales 6. flexor digiti minimi brevis	1. opponens pollicis 2. adductor pollicis 3. opponend digiti minimi 4. palmar interossei 5. dorsal interossei

	7. abductor digiti minimi 8. tendons of flexors digitorum	
Anterior and medial groups of thigh	1. sartorius 2. rectus femoris 3. vastus medialis 4. vastus lateralis 5. pectineus 6. adductor longus 7. gracilis femoris 8. tensor fasciae latae (muscle of hip) 9. iliotibial track	1. vastus intermedius 2. adductor magnus 3. adductor brevis
Gluteus and posterior groups of thigh	1. gluteus maximus 2. gluteus medius 3. biceps femoris 4. semitendinosus 5. semimembranosus	1. gluteus minimus 2. piriformis 3. obturator internus 4. gemellus superior 5. gemellus inferior 6. quadratus femoris
Muscles of leg	1. tibialis anterior 2. extensor digitorum longus 3. peroneus longus 4. peroneus brevis 5. gastrocnemius 6. soleus 7. plantaris 8. retinaculum 9. extensorum 10. tendo calcaneus	1. popliteus 2. tibialis posterior 3. flexor hallucis longus 4. flexor digitorum longus 5. extensor hallucis longus 6. peroneus brevis
Muscles of dorsum of foot	1. extensor hallucis brevis 2. extensor digitorum brevis 3. dorsal interossei	1. dorsal interossei 2. tendons of extensors brevis
Plantar muscles	1. plantar aponeurosis 2. flexor digitorum brecis 3. abductor hallucis 4. abductor digiti minimi 5. lumbricales 6. flexor digiti minimi brevis 7. flexor hallucis brevis	1. quadratus plantae 2. plantar interossei 3. adductor hallucis

Body Three: Visceral Specimen

Art-No. : STW003

Synopsis: Thoracic wall and abdominal wall are removed to display organs in the thoracic cavity and abdominal cavity. Some special dissection measures are taken in some parts. For example, in the thoracic cavity, one lung is remained, while the other one is removed and the bronchial tree is remained to clearly display not only the inner structure of lung but also the intercostal nerves and blood vessels along the ribs. The students can obtain more direct messages by means of this kind of specimen. So this specimen is the best teaching specimen for the students to study and understand the forms, positions and relationships of the organs.

Displaying contents:

Neck: pharynx, esophagus, larynx (median-sagittal cut), some laryngeal cartilages and cricothyroid muscle, trachea and thyroid gland.

Thoracic cavity: The tissue of the right lung has been removed except for the bronchial tree and the left lung is remained completely. The pericardium is open. Because of the window on the right ventricle, the trabecular carneae, papillary muscles, chordae tendineae and atroventricular valves are clearly displayed.

Abdominal cavity: 1. The remained organs are liver, pancreas, stomach (only fundus and pyloric part), duodenum, terminal part of ileum, caecum and vermiform appendix, ascending and descending colons (including left and right colic flexures), sigmoid colon, rectum, spleen, the two kidneys and superarenal glands, the two ureter, urinary bladder (a window on it to display trigone of bladder), superior and inferior mesenteric arteries. In addition, testis, ductus deferens, seminal vesicle, and penis are remained on a male specimen, while ovary, uterine tube and uterus are remained on a female specimen. 2. The inferior vena cava, renal veins, abdominal aorta, inernal and external iliac veins and arteries are remained. 3. The diaphragm, iliopsoas, psoas minor and quadratus lumborum are remained. The superficial and deep layer muscles are displayed on the left and right limbs respectively.

Body Four: Specimen with all arteries

Art-No: STW004

Synopsis: The specimen with partial muscles supported by the skeleton systemically displays the larger arteries and their branches which have been delicately dissected.

Displaying contents:

Name	Left (superficial layer)	Right (deep layer)
Common carotid a. and it's branches	1. common carotid a. 2. internal carotid a. 3. external carotid a. 4. superior thyroid a. 5. superior laryngeal a. 6. facial a. 7. lingual a. 8. superficial temporal a. 9. supraorbital a. 10. supratrochlear a. 11. posterior auricular a.	1. maxillary a. 2. infraorbital a. 3. middle meningeal a. 4. inferior alveolar a.
Subclavian a. and it's branches	1. subclavian a. 2. thyrocervical trunk	1. vertebral a. 2. ascending carotid a.

	3. inferior thyroid a. 4. ascending carotid a. 5. transverse carotid a. 6. internal thoracic a. 7. intercostals aa. 8. musculophrenic a. 9. costocervical trunk 10. axillary a. 11. thoracoacromial a. 12. lateral thoracic a. 13. subscapular a. 14. thoracodorsal a. 15. 15anterior humeral circumflex a. 16. posterior humeral circumflex a. 17. suprathoracic a. 18. brachial a. 19. deep brachial a. 20. superior and inferior ulnar collateral a. 21. ulnar a. 22. recurrent ulnar a. 23. radial a. 24. recurrent radial a. 25. common interosseous a. 26. anterior and posterior interosseous a. 27. superficial palmar arch 28. common palmar digital a. 29. proper palmar digital a. 30. principal a. of thumb	3. inferior thyroid a. 4. scapular arterial rete (circumflex scapular a., dorsal scapular a. and suprascapular a. 5. deep palmar arch 6. palmar metacarpal a.
Thoracic aorta and it's branches	1. posterior intercoatal a. 2. superior phrenic a. 3. esophageal a. 4. bronchial a. 5. pericardial a.	
Abdominal aorta and it's branches	1. celiac trunk 2. left and right gastric a. 3. common hepatic a. 4. splenic a. 5. left and right gastroepiploic a. 6. short gastric a. 7. proper hepatic a. 8. gastroduodenal a. 9. superior mesenteric a. 10. jejunal a. 11. ileal a. 12. ileocolic a. 13. right and middle colic a. 14. inferior mesenteric a. 15. left colic a. 16. sigmoid a. 17. superior rectal a. 18. left and right renal a. 19. left and right testicular(or ovarian) a. 20. Middle suprarenal a. 21. inferior phrenic a.	

	22. lumbar a. 23. median sacral a.	
Internal iliac a. and it's branches	1. internal iliac a. 2. obturator a. 3. superior and inferior gluteal a. 4. umbilical a. 5. inferior vesical a. 6. inferior rectal a. 7. uterine a. 8. internal pudendal a.	
External iliac a. and it's branches	1. external iliac a. 2. femoral a. 3. superficial iliac circumflex a. 4. inferior epigastric a. 5. superficial epigastric a. 6. external pudendal a. 7. medial and lateral superior genicular a. 8. medial and lateral inferior genicular aa. 9. median genicular a. 10. descending genicular a. 11. anterior tibial recurrent a. 12. anterior and posterior tibial a. 13. peroneal a. 14. dorsal a. of foot	4. deep femoral a. 5. perforating a. 6. medial and lateral femoral circumflex a.

Body Five: Nervous Specimen

No: STW005

Synopsis: Structure of nervous system is very complicated, so it is not only the emphases but also the difficulty in the teaching. This specimen supported by skeleton specially displays central and peripheral nervous system by removing the other tissue and structure. We think it is a perfect specimen for comprehensive and systemic understanding and studying.

Displaying contents:

Position	Left (supericial layer)	Right (deep layer)
Head and face	The brain is remained. Windows are opened on the skull and 1cm wide bone is preserved along two sides of the sagittal suture. The lateral wall of orbit is removed to display optic n., lacrimal gland and nerves in the orbit. The sternocleidomastoid is remained. 1. facial n. 2. lesser and greater occipital n. 3. great auricular n. 4. transverse n. of neck 5. supraclavicular n. 6. supraorbital n. 7. supratrochlear n. 8. lateral branch of accessory n.	The right cerebellar hemisphere is removed. The sternocleidomastoid is remained. 1. trigeminal n. and ganglion 2. mandibular n. 3. lingual n. 4. hypoglossal n. 5. vagus n. 6. accessory n. 7. ansa cervicalis 8. glossopharyngeal n. 9. superior laryngeal n. 10. recurrent laryngeal n. 11. brachial plexus
Trunk	All the organs in thoracic and abdominal cavities are removed. The vertebral canal is opened to display spinal cord and its meninges, roots of spinal n. and their branches.	
	Some ribs and intercostal muscles are cut to display intercostal n. and their anterior and lateral cutaneous branches, posterior branches of spinal n. The supraspinatus, infraspinatus, some intercostals muscles, obliquus abdominise and diaphragm are preserved.	Some intercostals muscles, obliquus abdominise and diaphragm are preserved. 1. sympathetic trunk 2. greater and lesser splanchnic n. 3. phrenic n. 4. vagus n. 5. recurrent laryngeal n. 6. azygos v. 7. superior vena cava
	1. iliohypogastric n. 2. ilioinguinal n.	1. iliohypogastric n. 2. ilioinguinal n. 3. genitofemoral n. 4. obturator n. 5. sacral plexus 6. femoral n. 7. celiac ganglia 8. celiac plexus 9. sympathetic trunk
Upper limb	The tendon of biceps brachii and triceps brachii are preserved. 1. median n.	The biceps brachii, triceps brachii, pronator teres and pronator quadratus are preserved.

	2. ulnar n. 3. radial n. 4. axillary n. 5. musculocutaneous n. 6. thoracodorsal n. 7. long thoracic n. 8. medial brachial cutaneous n. 9. medial and lateral antebrachial cutaneous n. 10. superficial and deep branches of radial n. 11. posterior interosseous n. 12. n. of hand	1. radial n. 2. anterior interosseous n. 3. deep branch of ulnar n.
Lower limb	The gluteus minimus, piriformis, gemellus superior and inferior, the tendon of obturator externus, sartorius, vastus medialis and lateralis, gracilis femoris, tibialis posteriorand extensor digitorum are preserved. 1. lateral femoral cutaneous n. 2. anterior cutaneous branch of femoral n. 3. saphenous n. 4. posterior femoral cutaneous n. 5. superior, middle and inferior gluteal cutaneous n. 6. common peroneal n. 7. medial and lateral sural cutaneous nn. 8. tibial n. 9. superficial peroneal n. 10. medial, middle and lateral dorsal cutaneous n.	The gluteus minimus, piriformis, gemellus superior and inferior, the tendon of obturator externus, sartorius, rectus femoris, gracilis femoris, tibialis posterior, peroneus longus and peroneus brevis are preserved. 1. anterior branch of obturator n. 2. superior and inferior gluteal nn. 3. pudendal n. 4. sciatic n. 5. deep peroneal n.