EXTERNAL CONTROL OF HUMAN EXTREMITIES pdf

1: Human body temperature - Wikipedia

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Fever A temperature setpoint is the level at which the body attempts to maintain its temperature. When the setpoint is raised, the result is a fever. Most fevers are caused by infectious disease and can be lowered, if desired, with antipyretic medications. An early morning temperature higher than If temperature is raised, but the setpoint is not raised, then the result is hyperthermia. Hyperthermia Hyperthermia occurs when the body produces or absorbs more heat than it can dissipate. It is usually caused by prolonged exposure to high temperatures. The heat-regulating mechanisms of the body eventually become overwhelmed and unable to deal effectively with the heat, causing the body temperature to climb uncontrollably. Common symptoms include headache, confusion, and fatigue. If sweating has resulted in dehydration, then the affected person may have dry, red skin. In a medical setting, mild hyperthermia is commonly called heat exhaustion or heat prostration; severe hyperthermia is called heat stroke. Heat stroke may come on suddenly, but it usually follows the untreated milder stages. Treatment involves cooling and rehydrating the body; fever-reducing drugs are useless for this condition. This may be done through moving out of direct sunlight to a cooler and shaded environment, drinking water, removing clothing that might keep heat close to the body, or sitting in front of a fan. Bathing in tepid or cool water, or even just washing the face and other exposed areas of the skin, can be helpful. Hypothermia In hypothermia, body temperature drops below that required for normal metabolism and bodily functions. In humans, this is usually due to excessive exposure to cold air or water, but it can be deliberately induced as a medical treatment. Basal body temperature[edit] Main article: Basal body temperature Basal body temperature is the lowest temperature attained by the body during rest usually during sleep. It is generally measured immediately after awakening and before any physical activity has been undertaken, although the temperature measured at that time is somewhat higher than the true basal body temperature. In women, temperature differs at various points in the menstrual cycle , and this can be used in the long-term to track ovulation both for the purpose of aiding conception or avoiding pregnancy. This process is called fertility awareness. Core temperature[edit] Core temperature, also called core body temperature, is the operating temperature of an organism , specifically in deep structures of the body such as the liver , in comparison to temperatures of peripheral tissues. Core temperature is normally maintained within a narrow range so that essential enzymatic reactions can occur. Significant core temperature elevation hyperthermia or depression hypothermia that is prolonged for more than a brief period of time is incompatible with human life. Temperature examination in the rectum is the traditional gold standard measurement used to estimate core temperature oral temperature is affected by hot or cold drinks and mouth-breathing. Rectal temperature is expected to be approximately one Fahrenheit degree higher than an oral temperature taken on the same person at the same time. Ear thermometers measure eardrum temperature using infrared sensors. The blood supply to the tympanic membrane is shared with the brain. However, this method of measuring body temperature is not as accurate as rectal measurement and has a low sensitivity for fevers, missing three or four out of every ten fevers in children. Until recently, direct measurement of core body temperature required surgical insertion of a probe, so a variety of indirect methods have commonly been used. The rectal or vaginal temperature is generally considered to give the most accurate assessment of core body temperature, particularly in hypothermia. In the early s, ingestible thermistors in capsule form were produced, allowing the temperature inside the digestive tract to be transmitted to an external receiver; one study found that these were comparable in accuracy to rectal temperature measurement. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. Cardio-respiratory collapse will likely occur. They may become comatose, be in severe delirium, vomiting, and convulsions can occur. Blood pressure may be high or low and heart rate will be very fast. There may also be palpitations and breathlessness. Starts to be life-threatening. Fast heart rate and breathlessness. There may be exhaustion accompanying this. Children and people with epilepsy may be very likely to get convulsions at this point. If this is caused by fever , there may also be chills.

EXTERNAL CONTROL OF HUMAN EXTREMITIES pdf

2: extremity - Dictionary Definition : www.enganchecubano.com

External control of human extremities; the Proceedings of the international symposium, Dubrovnik, August September 2, Responsibility Sponsored by the Institute for Automation and Telecommunications "Mihailo Pupin," Belgrade.

One of the acute effects in muscle during resistance training is the depletion of metabolic substrates, such as creatine phosphate and glycogen. The depletion of those two fuel sources during resistance training causes muscle power production to decrease. Another significant acute muscle adaptation duringâ€¦ The muscle groups and their actions The following sections provide a basic framework for the understanding of gross human muscular anatomy, with descriptions of the large muscle groups and their actions. The various muscle groups work in a coordinated fashion to control the movements of the human body. The neck The motion of the neck is described in terms of rotation, flexion, extension, and side bending i. The direction of the action can be ipsilateral, which refers to movement in the direction of the contracting muscle, or contralateral, which refers to movement away from the side of the contracting muscle. Muscles of the neck. Rotation is one of the most-important actions of the cervical neck spine. Rotation is accomplished primarily by the sternocleidomastoid muscle, which bends the neck to the ipsilateral side and rotates the neck contralaterally. Together, the sternocleidomastoid muscles on both sides of the neck act to flex the neck and raise the sternum to assist in forced inhalation. The anterior and middle scalene muscles, which also are located at the sides of the neck, act ipsilaterally to rotate the neck, as well as to elevate the first rib. The splenius capitis and splenius cervicis, which are located in the back of the neck, work to rotate the head. Side bending also is an important action of the cervical spine. The sternocleidomastoid muscles are involved in cervical side bending. The posterior scalene muscles, located on the lower sides of the neck, ipsilaterally bend the neck to the side and elevate the second rib. The splenius capitis and splenius cervicis also assist in neck side bending. The erector spinae muscles iliocostalis, longissimus, and spinalis are large, deep muscles that extend the length of the back. All three act to ipsilaterally side bend the neck. Neck flexion refers to the motion used to touch the chin to the chest. It is accomplished primarily by the sternocleidomastoid muscles, with assistance from the longus colli and the longus capitis, which are found in the front of the neck. Neck extension is the opposite of flexion and is accomplished by many of the same muscles that are used for other neck movements, including the splenius cervicis, splenius capitis, iliocostalis, longissimus, and spinalis muscles. The back The back contains the origins of many of the muscles that are involved in the movement of the neck and shoulders. In addition, the axial skeleton that runs vertically through the back protects the spinal cord , which innervates almost all the muscles in the body. Muscles of the back. The erector spinae muscles, for example, extend the back bend it backward and side bend the back. The semispinalis dorsi and semispinalis capitis muscles also extend the back. The small muscles of the vertebrae the multifidi and rotators help rotate, extend, and side bend the back. The quadratus lumborum muscle in the lower back side bends the lumbar spine and aids in the inspiration of air through its stabilizing affects at its insertion at the 12th rib the last of the floating ribs. The scapula shoulder blade is elevated by the trapezius muscle , which runs from the back of the neck to the middle of the back, by the rhomboid major and rhomboid minor muscles in the upper back, and by the levator scapulae muscle, which runs along the side and back of the neck. The shoulder The shoulder is a complex ball-and-socket joint comprising the head of the humerus , the clavicle collarbone , and the scapula. Muscles of the shoulder. Shoulder flexion is movement of the shoulder in a forward motion. An example of shoulder flexion can be seen when reaching forward to grasp an object. That action is accomplished primarily by the combined actions of the deltoid muscle in the uppermost extent of the arm, the pectoralis major muscle in the chest, the coracobrachialis muscle on the inside of the upper arm, and the biceps brachii muscles on the front of the upper arm. Extension of the shoulder is opposite to flexion. Pure shoulder extension is the movement of the arm directly behind the body, as in receiving a baton in a relay race. That movement is accomplished by the actions of the deltoid muscle, the latissimus dorsi muscle in the back, the teres major muscle in the armpit area, and the triceps muscle in the back of the upper arm. The triceps, as the name suggests, consists of three heads that originate from different surfaces but share the same insertion at the olecranon process of the ulna a bone in the forearm ; the three heads together act to extend the elbow. Shoulder adduction and abduction serve to lower the arm toward and lift the arm away from the body, respectively. They can be visualized by picturing someone doing jumping jacks. Adduction is accomplished primarily by the pectoralis major, latissimus dorsi, teres major, triceps, and coracobrachialis. The deltoid and the supraspinatus, a muscle that runs along the scapula in the back, are the two main abductors of the shoulder. An example of external rotation of the shoulder is seen in a tennis backhand stroke. External rotation is attributed primarily to the deltoid, the teres minor in the armpit area, and the infraspinatus muscle, which covers the scapula. Internal rotation of the shoulder is the opposite of external rotation. An example is the shoulder movement that occurs when reaching into a back pocket. That movement is achieved through the coordinated action of the pectoralis major, latissimus dorsi, deltoid, teres major, and subscapularis muscles. The subscapularis is a deep muscle situated on the anterior, or front-facing, surface of the scapula. The teres minor, subscapularis, supraspinatus, and infraspinatus muscles together form the rotator cuff, which stabilizes the humeral head the ball portion of the ball-and-socket shoulder joint. The muscles of the rotator cuff are common sites of injury in adults, particularly among people who perform overhead motions repeatedly e. Several of the rotator cuff muscles have tendons that run under the acromion, a bony prominence at the distal end of the scapula. The term distal describes a relative position away from the centre of the body; it often is contrasted with the term proximal, which describes a relative position near to the centre of the body. The position of the tendons and of the subacromial bursae fluid-filled sacs located beneath the acromion leaves them vulnerable to compression and pinching, which can result in an injury known as shoulder impingement syndrome. The arm In addition to aiding the movement of the shoulder, the muscles of the upper arm produce various movements of the forearm. For example, the primary muscles involved in forearm flexion, in which the angle formed at the elbow becomes smaller i. Minor contributions to forearm flexion are provided by the coracobrachialis and by flexor muscles situated in the anterior compartment of the forearm the palm side of the forearm; also known as the flexor compartment , including the pronator teres, the flexor carpi radialis, the flexor digitorum superficialis, the palmaris longus, and the flexor carpi ulnaris. Muscles of the upper arm. Muscles of the human forearm anterior view, superficial layer. Extension of the forearm increases the angle at the elbow, moving the hand away from the shoulder. That action is accomplished primarily by the triceps brachii. Other muscles that make minor contributions to forearm extension include the extensor muscles of the posterior compartment of the forearm the side of the forearm that is contiguous with the back of the hand; also known as the extensor compartment , including the extensor carpi radialis longus, the extensor carpi radialis brevis, the extensor digitorum, the extensor carpi ulnaris, and the anconeus. The wrist Wrist flexion refers to movement of the wrist that draws the palm of the hand downward. That action is carried out by the flexor carpi radialis, the flexor carpi ulnaris, the flexor digitorum superficialis, the flexor digitorum profundus, and the flexor pollicis longus. Muscles of the forearm posterior view. Wrist extension, by contrast, shortens the angle at the back of the wrist. The muscles responsible for that action are the extensor carpi radialis longus and the extensor carpi radialis brevis, which also abduct the hand at the wrist move the hand in the direction of the thumb, or first digit ; the extensor digitorum, which also extends the index to little finger the second to fifth digits ; the extensor digiti minimi, which also extends the little finger and adducts the hand moves the hand in the direction of the little finger ; and the extensor carpi ulnaris, which also adducts the hand. Other small muscles that cross the wrist joint may add to wrist extension, but they do so to only a small degree. Wrist supination is the rotation of the wrist that brings the palm facing up. The supinator muscle in the posterior compartment acts to supinate the forearm. The biceps brachii also adds to supination. Pronation is the opposing action, in which the wrist is rotated so that the palm is facing down. The pronator quadratus, a deep muscle in the anterior compartment, along with the pronator teres, pronates the forearm. The hand The hand is a complex structure that is involved in fine motor coordination and complex task performance. Its muscles generally are small and extensively innervated. Even simple actions, such as typing on a keyboard, require a multitude of precise movements to be carried out by the hand muscles. Because of that complexity, the following paragraphs cover only the primary action of each hand muscle. Several muscles that originate at the posterior surface of the ulna or the radius the other bone in the forearm have their actions in the hand. Those include the abductor pollicis longus, which abducts and extends the thumb; the extensor pollicis brevis, which extends the metacarpophalangeal MCP joint of the thumb; the extensor pollicis, which extends the distal phalanx finger bone of the thumb; and the extensor indicis, which extends the index finger at the MCP joint. MCP joints are located between the metacarpal bones, which are situated in the hand, and the phalanges, which are the small bones of the fingers. Although several of the muscles that move the hand have their origins in the forearm, there are many small muscles of the hand that have both their origin and their insertion within the hand. Those are referred to as the intrinsic muscles of the hand. They include the palmaris brevis, which assists with grip; the umbricals, which flex the MCP joints and extend the interphalangeal joints IPs; the joints between the phalanges of the fingers; the palmar interossei, which adduct the fingers toward the middle finger the third digit ; and the dorsal interossei, which abduct the fingers away from the middle finger. The thenar eminence is located on the palm side of the base of the thumb and is composed of three muscles, the abductor pollicis brevis, the flexor pollicis brevis, and the opponens pollicis, all of which are innervated by the median nerve. The abductor pollicis brevis abducts the thumb; the flexor pollicis brevis flexes the MCP joint of the thumb; and the opponens pollicis acts to oppose the thumb to the other fingers. The adductor pollicis, which is not part of the thenar eminence, acts to adduct the thumb. The hypothenar enimence is located on the palm side of the hand below the little finger. It contains three muscles that are innervated by the deep branch of the ulnar nerve. The abductor digiti minimi abducts the little finger. The flexor digiti minimi flexes the little finger. The opponens digiti minimi opposes the little finger with the thumb. The abdomen There are three muscular layers of the abdominal wall, with a fourth layer in the middle anterior region. The fourth layer in the midregion is the rectus abdominis, which has vertically running muscle fibres that flex the trunk and stabilize the pelvis. To either side of the rectus abdominis are the other three layers of abdominal muscles. The deepest of those layers is the transversus abdominis, which has fibres that run perpendicular to the rectus abdominus; the transversus abdominis acts to compress and support the abdomen and provides static core stabilization. The internal oblique layers run upward and forward from the sides of the abdomen, and the external oblique layers, which form the outermost muscle layers of the abdomen, run downward and forward. Muscles of the abdominal wall. The hip The hip joint is a complex weight-bearing ball-and-socket joint that can sustain considerable load. The socket of the joint is relatively deep, allowing for stability but sacrificing some degree in range of motion. The movements described in this section include flexion, extension, abduction, and adduction.

3: Homeostasis - Wikipedia

External control of human extremities; the Proceedings of the international symposium, Dubrovnik, August September 2,

Sodium in biology , Tubuloglomerular feedback , and Sodium-calcium exchanger The homeostatic mechanism which controls the plasma sodium concentration is rather more complex than most of the other homeostatic mechanisms described on this page. The sensor is situated in the juxtaglomerular apparatus of kidneys, which senses the plasma sodium concentration in a surprisingly indirect manner. Instead of measuring it directly in the blood flowing past the juxtaglomerular cells , these cells respond to the sodium concentration in the renal tubular fluid after it has already undergone a certain amount of modification in the proximal convoluted tubule and loop of Henle. In response to a lowering of the plasma sodium concentration, or to a fall in the arterial blood pressure, the juxtaglomerular cells release renin into the blood. This decapeptide is known as angiotensin I. However, when the blood circulates through the lungs a pulmonary capillary endothelial enzyme called angiotensin-converting enzyme ACE cleaves a further two amino acids from angiotensin I to form an octapeptide known as angiotensin II. Angiotensin II is a hormone which acts on the adrenal cortex , causing the release into the blood of the steroid hormone , aldosterone. Angiotensin II also acts on the smooth muscle in the walls of the arterioles causing these small diameter vessels to constrict, thereby restricting the outflow of blood from the arterial tree, causing the arterial blood pressure to rise. This, therefore, reinforces the measures described above under the heading of "Arterial blood pressure" , which defend the arterial blood pressure against changes, especially hypotension. The angiotensin II-stimulated aldosterone released from the zona glomerulosa of the adrenal glands has an effect on particularly the epithelial cells of the distal convoluted tubules and collecting ducts of the kidneys. Here it causes the reabsorption of sodium ions from the renal tubular fluid , in exchange for potassium ions which are secreted from the blood plasma into the tubular fluid to exit the body via the urine. The hyponatremia can only be corrected by the consumption of salt in the diet. However, it is not certain whether a "salt hunger" can be initiated by hyponatremia, or by what mechanism this might come about. When the plasma sodium ion concentration is higher than normal hypernatremia , the release of renin from the juxtaglomerular apparatus is halted, ceasing the production of angiotensin II, and its consequent aldosterone-release into the blood. The kidneys respond by excreting sodium ions into the urine, thereby normalizing the plasma sodium ion concentration. The low angiotensin II levels in the blood lower the arterial blood pressure as an inevitable concomitant response. The reabsorption of sodium ions from the tubular fluid as a result of high aldosterone levels in the blood does not, of itself, cause renal tubular water to be returned to the blood from the distal convoluted tubules or collecting ducts. This is because sodium is reabsorbed in exchange for potassium and therefore causes only a modest change in the osmotic gradient between the blood and the tubular fluid. Furthermore, the epithelium of the distal convoluted tubules and collecting ducts is impermeable to water in the absence of antidiuretic hormone ADH in the blood. ADH is part of the control of fluid balance. Its levels in the blood vary with the osmolality of the plasma, which is measured in the hypothalamus of the brain. However, low aldosterone levels cause a loss of sodium ions from the ECF, which could potentially cause a change in extracellular osmolality and therefore of ADH levels in the blood. Aldosterone acts primarily on the distal convoluted tubules and collecting ducts of the kidneys, stimulating the excretion of potassium ions into the urine. Osmoregulation and Thirst The total amount of water in the body needs to be kept in balance. Fluid balance involves keeping the fluid volume stabilized, and also keeping the levels of electrolytes in the extracellular fluid stable. Fluid balance is maintained by the process of osmoregulation and by behavior. Osmotic pressure is detected by osmoreceptors in the median preoptic nucleus in the hypothalamus. Measurement of the plasma osmolality to give an indication of the water content of the body, relies on the fact that water losses from the body, through unavoidable water loss through the skin which is not entirely waterproof and therefore always slightly moist, water vapor in the exhaled air , sweating , vomiting , normal feces and especially diarrhea are all hypotonic , meaning that they are less salty than the body fluids compare, for instance, the taste of saliva with that of tears. The latter has almost the same salt content as the extracellular fluid, whereas the former is hypotonic with respect to the plasma. Saliva does not taste salty, whereas tears are decidedly salty. Nearly all normal and abnormal losses of body water therefore cause the extracellular fluid to become hypertonic. Conversely, excessive fluid intake dilutes the extracellular fluid causing the hypothalamus to register hypotonic hyponatremia conditions. When the hypothalamus detects a hypertonic extracellular environment, it causes the secretion of an antidiuretic hormone ADH called vasopressin which acts on the effector organ, which in this case is the kidney. The effect of vasopressin on the kidney tubules is to reabsorb water from the distal convoluted tubules and collecting ducts , thus preventing aggravation of the water loss via the urine. The hypothalamus simultaneously stimulates the nearby thirst center causing an almost irresistible if the hypertonicity is severe enough urge to drink water. The cessation of urine flow prevents the hypovolemia and hypertonicity from getting worse; the drinking of water corrects the defect. Hypo-osmolality results in very low plasma ADH levels. This results in the inhibition of water reabsorption from the kidney tubules, causing high volumes of very dilute urine to be excreted, thus getting rid of the excess water in the body. Urinary water loss, when the body water homeostat is intact, is a compensatory water loss, correcting any water excess in the body. However, since the kidneys cannot generate water, the thirst reflex is the all-important second effector mechanism of the body water homeostat, correcting any water deficit in the body. Acidâ€”base homeostasis and Acid-base imbalance The plasma pH can be altered by respiratory changes in the partial pressure of carbon dioxide; or altered by metabolic changes in the carbonic acid to bicarbonate ion ratio. The bicarbonate buffer system regulates the ratio of carbonic acid to bicarbonate to be equal to 1: A change in the plasma pH gives an acidâ€”base imbalance. In acidâ€—base homeostasis there are two mechanisms that can help regulate the pH. Respiratory compensation a mechanism of the respiratory center , adjusts the partial pressure of carbon dioxide by changing the rate and depth of breathing, to bring the pH back to normal. The partial pressure of carbon dioxide also determines the concentration of carbonic acid, and the bicarbonate buffer system can also come into play. Renal compensation can help the bicarbonate buffer system. The sensor for the plasma bicarbonate concentration is not known for certain. It is very probable that the renal tubular cells of the distal convoluted tubules are themselves sensitive to the pH of the plasma. Bicarbonate ions are simultaneously secreted into the blood that decreases the carbonic acid, and consequently raises the plasma pH. When hydrogen ions are excreted into the urine, and bicarbonate into the blood, the latter combines with the excess hydrogen ions in the plasma that stimulated the kidneys to perform this operation. The resulting reaction in the plasma is the formation of carbonic acid which is in equilibrium with the plasma partial pressure of carbon dioxide. This is tightly regulated to ensure that there is no excessive build-up of carbonic acid or bicarbonate. The overall effect is therefore that hydrogen ions are lost in the urine when the pH of the plasma falls. The concomitant rise in the plasma bicarbonate mops up the increased hydrogen ions caused by the fall in plasma pH and the resulting excess carbonic acid is disposed of in the lungs as carbon dioxide. This restores the normal ratio between bicarbonate and the partial pressure of carbon dioxide and therefore the plasma pH. The converse happens when a high plasma pH stimulates the kidneys to secrete hydrogen ions into the blood and to excrete bicarbonate into the urine. The hydrogen ions combine with the excess bicarbonate ions in the plasma, once again forming an excess of carbonic acid which can be exhaled, as carbon dioxide, in the lungs, keeping the plasma bicarbonate ion concentration, the partial pressure of carbon dioxide and, therefore, the plasma pH, constant. Cerebrospinal fluid[edit] Cerebrospinal fluid CSF allows for regulation of the distribution of substances between cells of the brain, [59] and neuroendocrine factors, to which slight changes can cause problems or damage to the nervous system. For example, high glycine concentration disrupts temperature and blood pressure control, and high CSF pH causes dizziness and syncope. Inhibitory neurons using GABA , make compensating changes in the neuronal networks preventing runaway levels of excitation.

4: A List of Vital Organs in the Human Body: 10 Essential Organs

*Advances in External Control of Human Extremities 10 (Yugoslav Committee for Electronics, Telecommunication and Automation) [Dejan B. Popovic] on www.enganchecubano.com *FREE* shipping on qualifying offers. Collected papers from the conference on prosthetics in Belgrade, Yugoslavia.*

Accordingly, the method comprises providing a plurality of artificial proprioceptors, at least one of the artificial proprioceptors being on the side of the healthy leg, and at least one of the artificial proprioceptors being on provided with the prosthesis, generating data signals in real time at the artificial proprioceptors, and generating control signals in real time for controlling the actuating mechanism in response to the data signals. This invention is particularly well adapted for controlling an actuated leg prosthesis for above-knee amputees. Among such systems, conventional powered artificial limbs are notorious for having control problems. These conventional prostheses are equipped with basic controllers that artificially mobilize the joints without any interaction from the amputee and are only capable of generating basic motions. Such basic controllers do not take into consideration the dynamic conditions of the working environment, regardless the fact that the prosthesis is required to generate appropriate control within a practical application. Because human limb mobility is a complex process including voluntary, reflex and random events at the same time, conventional prostheses do not have the capability to interact simultaneously with the human body and the external environment in order to have minimal appropriate functioning. SUMMARY In accordance with one aspect of the present invention, there is provided a method of controlling an actuating mechanism of a prosthesis provided on one side of the lower body of an individual, the individual having a healthy leg on the other side, the method comprising: In accordance with another aspect of the present invention, there is provided a device for controlling an actuating mechanism of a prosthesis provided on one side of the lower body of an individual, the individual having a healthy leg on the other side, the device comprising: In accordance with a further aspect of the present invention, there is provided a lower extremities prosthesis provided on one side of the lower body of an individual, the individual having a healthy leg on the other side, the prosthesis comprising: These and other aspects of the present invention are described in or apparent from the following detailed description, which description is made in conjunction with the accompanying figures. It should be understood that the present invention is not limited to the illustrated implementation since various changes and modifications may be effected herein without departing from the scope of the appended claims. Artificial proprioceptors 20 are provided both on the healthy leg 12 and on the prosthesis The prosthesis 14 comprises an actuating mechanism 16 which may be either passive or active. A passive actuating mechanism may be generally defined as an electro-mechanical component that only absorbs mechanical energy in order to modify dynamics of mechanical joints of the prosthesis, while an active actuating mechanism may be generally defined as an electro-mechanical component that absorbs and supplies mechanical energy in order to modify dynamics of mechanical joints of the prosthesis. An example of a passive actuating mechanism is described in U. Examples of active actuating mechanisms are described in U. The purpose of the control system is to provide the requited signals allowing to control the actuating mechanism To do so, the control system is interfaced with the amputee 10 using the artificial proprioceptors 20 to ensure proper coordination between the amputee 10 and the movements of the prosthesis The control system is then used to determine the resistance to be applied to a joint, in the case of a passive actuating mechanism, or the joint trajectories and the required force or torque that must be applied by a joint, in the case of an active actuating mechanism, in order to provide coordinated movements. It should be noted that the present invention is not limited to its use with the mechanical configuration illustrated in FIG. The control system may be used with a leg prosthesis having more than one joint. For instance, it may be used with a prosthesis having an ankle joint, metatarsophalangeal joint or a hip joint in addition to a knee joint. Moreover, instead of a conventional socket, a osseo-integrated devices could also be used, ensuring a direct attachment between the mechanical component of the prosthesis and the amputee skeleton. Other kinds of prostheses may be used as well. The control system shown in FIG. They may be received either from an appropriate wiring or from a wireless transmission. The data signals from the artificial proprioceptors 20 provided on a healthy leg 12 are advantageously sent through the wireless transmission using an appropriate radio frequency RF module. Of course, other combinations of communication link technologies may be used, such as wired, wireless, optical, etc. Software residing on a controller 40 contains all the algorithms enabling the control system to provide the required signals allowing to control the actuating mechanism The artificial proprioceptors 20 , located on both the healthy leg 12 and the prosthesis 14 , may include myoelectric sensors, neuro-sensors, kinematic sensors, kinetic sensors or plantar pressure sensors. Myoelectric sensors are electrodes used to measure the internal or the external myoelectrical activity of skeletal muscles. Neuro-sensors are electrodes used to measure the summation of one or more action potentials of peripheral nerves. Kinematic sensors are used to measure the position of articulated joints, the mobility speed or acceleration of lower extremities. Kinetic sensors are used to measure rotational forces at the articulated joints or reaction forces of lower extremities. Plantar pressure sensors are used to measure the vertical plantar pressure of a specific underfoot area. Of course, additional types of sensors which provide information about various dynamics of human locomotion may be used. For a given application, the use of artificial proprioceptors 20 is not restricted to a specific type of sensor, multiple types of sensors in various combinations may be used. The controller 40 ensures, in real-time, the decomposition of the locomotion of an individual 10 based on the information provided by the artificial proprioceptors In accordance with the present invention, it was found that data signals received from individual artificial proprioceptors 20 located on both the healthy leg 12 and the prosthesis 14 of an individual 10 can provide enough information in order to control the actuating mechanism 16 of the prosthesis For instance, in the case of plantar pressure sensors, it has been noticed experimentally that the slope first derivative , the sign of the concavity second derivative and the slope of concavity third derivative of the data signals received from plantar pressure sensors, and of combinations of those signals, give highly accurate and stable information on the human locomotion and enable the decomposition of the human locomotion into a finite number of portions. This breakdown ensures the proper identification of the complete mobility dynamics of the lower extremities in order to model the human locomotion. Of course, the use of plantar pressure sensors is given as an example and does not limit the definition of artificial proprioceptors to such sensors. EXAMPLE In a sample application, the artificial proprioceptors 20 may comprise localized plantar pressure sensors, which measure the vertical plantar pressure of a specific underfoot area, combined with a pair of gyroscopes which measure the angular speed of body segments of the lower extremities and a kinematic sensor which measures the angle of the prosthesis 14 knee joint. The plantar pressure sensors are used under both feet, the foot of the healthy leg 12 as well as the foot of the prosthesis One of the gyroscopes is located at the shank of the healthy leg 12 while the other is located on the upper portion of the prosthesis 14 above the knee joint, i. As for the kinematic sensor, it is located at the prosthesis 14 knee joint. Of course, the use of plantar pressure sensors, gyroscopes and kinematic sensors is given as an example and does not limit the definition of artificial proprioceptors to such sensors. Each sensor 20 , as shown in FIG. Each cell 22 outputs a time variable electrical signal for which the intensity is proportional to the total vertical plantar pressure over its surface area. The size and position of the plantar pressure sensors 20 were defined in accordance with the stability and the richness intensity of the localized plantar pressure signals provided by certain underfoot areas during locomotion. Experimentation provided numerous data concerning the spatial distribution of foot pressures and more specifically on the Plantar Pressure Maximal Variation PPMV during locomotion. The PPMV was defined as the maximum variation of the plantar pressure at a particular point unnderfoot area of coordinate i,j during locomotion. It was found by experimentation that the calcaneus and the Metatarsophalangeal MP regions are two regions of the foot sole where the PPMV may be considered as providing a signal that is both stable and rich in information. The coefficients in Table 1 have been obtained by experimentation. A typical diameter for the plantar pressure sensors 20 is between 20 and 30 mm.

5: USB2 - Positioning of lower extremities artificial proprioceptors - Google Patents

International Symposium on the external control of human extremities]. [Article in German] Kreighoff R, de NÃ¨ve W. PMID: [PubMed - indexed for MEDLINE].

List of 10 Essential Organs of the Human Body written by: Review this helpful list when studying for a science test. This is a list of the ten most vital organs which is usually taught about in elementary school. Along with sweat glands, the skin contains oil glands. The oil your skin releases helps to keep your skin from drying out and your hair from becoming brittle. The skin also regularly sheds cells to maintain its effectiveness. If you can imagine, there are about 19 million skin cells in every square inch of the human body! The brain receives impulses from your nerves, which are located throughout your body and respond to pain and other stimulation. Even though the brain is so important, it is also very delicate. The brain is made of soft tissue and is protected only by the skull, which is why head injuries can be so serious. The average adult brain weighs 3 pounds. Without your heart, your other organs would not receive oxygen or have carbon dioxide removed. In an average lifetime, the heart beats more than 2. The job of the kidneys is to filter things like water and salts out of your blood and to produce urine. The kidneys also produce an enzyme called renin. This enzyme plays a big role in regulating your blood pressure. Did you know that a healthy person is able to live with only kidney? The main job of the liver is to produce bile, which it sends to the stomach for digestion. The liver also filters out toxins and regulates blood sugar. Blood sugar is regulated because the liver converts sugars and stores them, releasing them when more sugar is needed in the blood. The liver is also in charge of releasing cholesterol, breaking down fats, and producing blood proteins. It is the largest internal organ! The job of the pancreas is to produce enzymes necessary for digestion and send them to the stomach. The pancreas also regulates blood sugar and does this through its process of creating insulin. The pancreas also creates glucagon which has the opposite effect of insulin and also helps to maintain blood sugar levels. It does this using chemicals, such as emzymes. The small intenstine also absorbs nutrients from the food through villi and gives these nutrients to your blood. The small intenstine is 5 meters long! The food moves from your small intenstine to your large intenstine with a series of muscle contractions. The large intenstine is involved in digestion, and receives undigested food from the small intenstine. The large intenstine then absorbs as much water as possible and then expels the waste and any excess fiber. The lungs take in oxygen which goes into the blood through the heart, and expels carbon dioxide as the heart receives unoxygenated blood. These are my favorites: This game is like a giant jigsaw puzzle of the organs in the human body. It has a list of organs in the human body which you click on and drag it to the right place in the body, rotating if necessary. There are also a number of interesting facts for each organ.

EXTERNAL CONTROL OF HUMAN EXTREMITIES pdf

6: Control Bleeding

1. Med Prog Technol. Apr 25;4(4) Use of electrical stimulation in external control of motor activity and movements of human extremities.

See Article History Human skeletal system, the internal skeleton that serves as a framework for the body. This framework consists of many individual bones and cartilages. There also are bands of fibrous connective tissue â€”the ligaments and the tendons â€”in intimate relationship with the parts of the skeleton. This article is concerned primarily with the gross structure and the function of the skeleton of the normal human adult. The human skeleton, like that of other vertebrates , consists of two principal subdivisions, each with origins distinct from the others and each presenting certain individual features. These are 1 the axial , comprising the vertebral column â€”the spineâ€”and much of the skull , and 2 the appendicular , to which the pelvic hip and pectoral shoulder girdles and the bones and cartilages of the limbs belong. Discussed in this article as part of the axial skeleton is a third subdivision, the visceral, comprising the lower jaw , some elements of the upper jaw, and the branchial arches, including the hyoid bone. When one considers the relation of these subdivisions of the skeleton to the soft parts of the human bodyâ€—such as the nervous system , the digestive system , the respiratory system , the cardiovascular system , and the voluntary muscles of the muscle system â€—it is clear that the functions of the skeleton are of three different types: Of these functions, support is the most primitive and the oldest; likewise, the axial part of the skeleton was the first to evolve. The vertebral column, corresponding to the notochord in lower organisms, is the main support of the trunk. The central nervous system lies largely within the axial skeleton, the brain being well protected by the cranium and the spinal cord by the vertebral column, by means of the bony neural arches the arches of bone that encircle the spinal cord and the intervening ligaments. A distinctive characteristic of humans as compared with other mammals is erect posture. The human body is to some extent like a walking tower that moves on pillars, represented by the legs. Tremendous advantages have been gained from this erect posture, the chief among which has been the freeing of the arms for a great variety of uses. Nevertheless, erect posture has created a number of mechanical problemsâ€—in particular, weight bearing. These problems have had to be met by adaptations of the skeletal system. Protection of the heart , lungs , and other organs and structures in the chest creates a problem somewhat different from that of the central nervous system. These organs, the function of which involves motion, expansion, and contraction, must have a flexible and elastic protective covering. Such a covering is provided by the bony thoracic basket, or rib cage , which forms the skeleton of the wall of the chest, or thorax. The connection of the ribs to the breastboneâ€—the sternum â€—is in all cases a secondary one, brought about by the relatively pliable rib costal cartilages. The small joints between the ribs and the vertebrae permit a gliding motion of the ribs on the vertebrae during breathing and other activities. The motion is limited by the ligamentous attachments between ribs and vertebrae. The third general function of the skeleton is that of motion. The great majority of the skeletal muscles are firmly anchored to the skeleton, usually to at least two bones and in some cases to many bones. Thus, the motions of the body and its parts, all the way from the lunge of the football player to the delicate manipulations of a handicraft artist or of the use of complicated instruments by a scientist, are made possible by separate and individual engineering arrangements between muscle and bone. In this article the parts of the skeleton are described in terms of their sharing in these functions. The disorders and injuries that can affect the human skeleton are described in the article bone disease.

7: human muscle system | Functions, Diagram, & Facts | www.enganchecubano.com

The human extremities from the control engineering point of view are Mathematical Bioscicriccs 8, www.enganchecubano.com (IJ6S) l'KOSTHETICS OF HI13IAS EXTREMITIES of a multivariable mechanical structure. Under normal conditions, the hand, arm, and lower extremities have a number of controllable joints (i.e., inputs and outputs).

Functionally, the muscles of the leg are either extensors, responsible for the dorsiflexion of the foot, or flexors, responsible for the plantar flexion. These muscles can also classified by innervation, muscles supplied by the anterior subdivision of the plexus and those supplied by the posterior subdivision. Dorsiflexion extension and plantar flexion occur around the transverse axis running through the ankle joint from the tip of the medial malleolus to the tip of the lateral malleolus. Pronation eversion and supination inversion occur along the oblique axis of the ankle joint. Three of the anterior muscles are extensors. From its origin on the lateral surface of the tibia and the interosseus membrane, the three-sided belly of the tibialis anterior extends down below the superior and inferior extensor retinacula to its insertion on the plantar side of the medial cuneiform bone and the first metatarsal bone. In the non-weight-bearing leg, the anterior tibialis dorsal flexes the foot and lifts the medial edge of the foot. In the weight-bearing leg, it pulls the leg towards the foot. The extensor digitorum longus has a wide origin stretching from the lateral condyle of the tibia down along the anterior side of the fibula, and the interosseus membrane. At the ankle, the tendon divides into four that stretch across the foot to the dorsal aponeuroses of the last phalanges of the four lateral toes. In the non-weight-bearing leg, the muscle extends the digits and dorsiflexes the foot, and in the weight-bearing leg acts similar to the tibialis anterior. The extensor hallucis longus has its origin on the fibula and the interosseus membrane between the two other extensors and is, similarly to the extensor digitorum, is inserted on the last phalanx of big toe "hallux". The muscle dorsiflexes the hallux, and acts similar to the tibialis anterior in the weight-bearing leg. The peroneus longus and brevis both have their origins on the fibula and they both pass behind the lateral malleolus where their tendons pass under the peroneal retinacula. Under the foot, the longus stretches from the lateral to the medial side in a groove, thus bracing the transverse arch of the foot. The brevis is attached on the lateral side to the tuberosity of the fifth metatarsal. Together the two peroneals form the strongest pronators of the foot. Of the posterior muscles three are in the superficial layer. The major plantar flexors, commonly referred to as the triceps surae , are the soleus , which arises on the proximal side of both leg bones, and the gastrocnemius , the two heads of which arises on the distal end of the femur. These muscles unite in a large terminal tendon, the Achilles tendon , which is attached to the posterior tubercle of the calcaneus. The plantaris closely follows the lateral head of the gastrocnemius. Its tendon runs between those of the soleus and gastrocnemius and is embedded in the medial end of the calcaneus tendon. Under the foot it splits into a thick medial part attached to the navicular bone and a slightly weaker lateral part inserted to the three cuneiform bones. The muscle produces simultaneous plantar flexion and supination in the non-weight-bearing leg, and approximates the heel to the calf of the leg. The flexor hallucis longus arises distally on the fibula and on the interosseus membrane from where its relatively thick muscle belly extends far distally. Its tendon extends beneath the flexor retinaculum to the sole of the foot and finally attaches on the base of the last phalanx of the hallux. It plantarflexes the hallux and assists in supination. The flexor digitorum longus , finally, has its origin on the upper part of the tibia. Its tendon runs to the sole of the foot where it forks into four terminal tendon attached to the last phalanges of the four lateral toes. It crosses the tendon of the tibialis posterior distally on the tibia, and the tendon of the flexor hallucis longus in the sole. Distally to its division, the quadratus plantae radiates into it and near the middle phalanges its tendons penetrate the tendons of the flexor digitorum brevis. In the non-weight-bearing leg, it plantar flexes the toes and foot and supinates. In the weight-bearing leg it supports the plantar arch. Intrinsic[edit] The intrinsic muscles of the foot, muscles whose bellies are located in the foot proper, are either dorsal top or plantar sole. On the dorsal side, two long extrinsic extensor muscles are superficial to the intrinsic muscles, and their tendons form the dorsal aponeurosis of the toes. The short intrinsic extensors and the plantar and dorsal interossei radiates into these aponeuroses. The extensor digitorum brevis and extensor hallucis brevis have a common origin on the anterior side of the calcaneus, from where their tendons extend into the dorsal aponeuroses of digits They act to dorsiflex these digits. All these muscles are covered by the thick and dense plantar aponeurosis , which, together with two tough septa, form the spaces of the three groups. These muscles and their fatty tissue function as cushions that transmit the weight of the body downward. As a whole, the foot is a functional entity. It is an abductor and a weak flexor, and also helps maintain the arch of the foot. Lateral to the abductor hallucis is the flexor hallucis brevis , which originates from the medial cuneiform bone and from the tendon of the tibialis posterior. The flexor hallucis has a medial and a lateral head inserted laterally to the abductor hallucis. It is an important plantar flexor which comes into prominent use in classical ballet i. Both heads are inserted on the lateral sesamoid bone of the first digit. The muscle acts as a tensor to the arches of the foot, but can also adduct the first digit and plantar flex its first phalanx. When present, it acts to plantar flex the fifth digit and supports the plantar arch. The flexor digiti minimi arises from the region of base of the fifth metatarsal and is inserted onto the base of the first phalanx of the fifth digit where it is usually merged with the abductor of the first digit. It acts to plantar flex the last digit. The largest and longest muscles of the little toe is the abductor digiti minimi. Except for supporting the arch, it plantar flexes the little toe and also acts as an abductor. Except for reinforcing the plantar arch, they contribute to plantar flexion and move the four digits toward the big toe. They are, in contrast to the lumbricales of the hand, rather variable, sometimes absent and sometimes more than four are present. The quadratus plantae arises with two slips from margins of the plantar surface of the calcaneus and is inserted into the tendon s of the flexor digitorum longus, and is known as the "plantar head" of this latter muscle. The three plantar interossei arise with their single heads on the medial side of the third-fifth metatarsals and are inserted on the bases of the first phalanges of these digits. The two heads of the four dorsal interossei arise on two adjacent metatarsals and merge in the intermediary spaces. Their distal attachment is on the bases of the proximal phalanges of the second-fourth digits. The interossei are organized with the second digit as a longitudinal axis; the plantars act as adductors and pull digits towards the second digit; while the dorsals act as abductors. Additionally, the interossei act as plantar flexors at the metatarsophalangeal joints. Lastly, the flexor digitorum brevis arises from underneath the calcaneus to insert its tendons on the middle phalanges of digit Because the tendons of the flexor digitorum longus run between these tendons, the brevis is sometimes called perforatus. The tendons of these two muscles are surrounded by a tendinous sheath. The brevis acts to plantar flex the middle phalanges. When stretching, muscles should feel somewhat uncomfortable but not physically agonizing. One of the most popular lower leg muscle stretches is the step standing heel raises, which mainly involves the gastrocnemius , soleus , and the Achilles tendon. This exercise is easily modified by holding on to a nearby rail for balance and is generally repeated times. In order to stretch the anterior muscles of the lower leg , crossover shin stretches work well. This stretch is typically held for 15â€”30 seconds. Stretching the eversion and inversion muscles allows for better range of motion to the ankle joint. Eversion muscles are stretched when the ankle becomes depressed from the starting position. In like manner, the inversion muscles are stretched when the ankle joint becomes elevated. Throughout this seated stretch, the ankle joint is to remain supported while depressed and elevated with the ipsilateral same side hand in order to sustain the stretch for 10â€”15 seconds. This stretch will increase overall eversion and inversion muscle group length and provide more flexibility to the ankle joint for larger range of motion during activity. Superficial femoral artery and Arcuate artery of the foot The arteries of the leg are divided into a series of segments. In the pelvis area, at the level of the last lumbar vertebra , the abdominal aorta , a continuation the descending aorta , splits into a pair of common iliac arteries. These immediately split into the internal and external iliac arteries , the latter of which descends along the medial border of the psoas major to exits the pelvis area through the vascular lacuna under the inguinal ligament. The canal passes from the anterior to the posterior side of the limb where the artery leaves through the adductor hiatus and becomes the popliteal artery. On the back of the knee the popliteal artery runs through the popliteal fossa to the popliteal muscle where it divides into anterior and posterior tibial arteries. Distal to the superior and extensor retinacula of the foot it becomes the dorsal artery of the foot. The posterior tibial forms a direct continuation of the popliteal artery which enters the flexor compartment of the lower leg to descend behind the medial malleolus where it divides into the medial and lateral plantar arteries , of which the posterior branch gives rise to the fibular artery. Posteriorly, the gluteal region corresponds to the gluteus maximus. The anterior region of the thigh extends distally from the femoral triangle to the region of the knee and laterally to the tensor fasciae latae. The posterior region ends distally before the popliteal fossa. The anterior and posterior regions of the knee extend from the proximal regions down to the level of the tuberosity of the tibia. In the lower leg the anterior and posterior regions extend down to the malleoli. Behind the malleoli are the lateral and medial retromalleolar regions and behind these is the region of the heel. Finally, the foot is subdivided into a dorsal region superiorly and a plantar region inferiorly. The veins are subdivided into three systems. The deep veins return approximately 85 percent of the blood and the superficial veins approximately 15 percent. A series of perforator veins interconnect the superficial and deep systems. In the standing posture, the veins of the leg have to handle an exceptional load as they act against gravity when they return the blood to the heart. The venous valves assist in maintaining the superficial to deep direction of the blood flow.

8: human skeletal system | Parts, Functions, Diagram, & Facts | www.enganchecubano.com

The paper presents some medical, technical and methodological aspects of the problem of supporting lost motorial functions of upper human extremities. Some results obtained in application of hybrid system for supporting the grasp movements - alive manipulators - are described.

9: BBC - GCSE Bitesize Science - Temperature Control : Revision

Human muscle system, the muscles of the human body that work the skeletal system, that are under voluntary control, and that are concerned with movement, posture, and balance. Broadly considered, human muscleâ€"like the muscles of all vertebratesâ€"is often divided into striated muscle (or skeletal muscle), smooth muscle, and cardiac muscle.

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