

HORSE

In our country the horses are bred for two main subjects: The first subject is for the horsemanship, while the other is the transportation.

Healthy horse:

There are three things which are the keys of a healthy horse. It has a good appetite and a digestive system that work well. It grows strong and fit for the work to which it accustomed. It is alert and perceptive.

Signs of health:

1. Behavior: Mature horses in field generally remain standing during the day. It is usual for horses to dose for about third of a time when they lie down, which hoppers more frequently in stables than in the open, horses go down front end firstly with bending of the front legs. They get up front firstly with straight front legs. Horses rest with the breast bone to one side and can only change sides by rolling their lags up. Sometimes they get up and lie down.
2. Appetite: when food is available continuously, the horse prefers to eat little. It is normal for the horse at grass to graze intermittently day and night.
3. Urination: Horses usually urinate at rest. Both horses and mares adopt a rather similar characteristic posture, which is achieved by extending both forelimbs and them lowering the abdomen, thenby increasing intra-abdominal pressure. This is assisted by the animal making an inspiration and holding it breath which slowly released produces a groaning sound. Horses protrude the flaccid penis from the preputial cavity to variable degree.

4. Dung: Dung should be green-brown to golden brown dependency on the diet. It should be moist and it should break slightly on hitting the ground.
5. Eyes and ears: The eyes should be bright and wide open and the ears mobile.

Feeding practice:

The horse prefers a diet based on roughage and on that is free from moulds or taint. Its digestive system is designed for a small intake at frequent intervals. Moreover, although the horse appreciates some variety, it does not like sudden change, particularly of the roughage part of its diet. This is because the roughage is broken down in the horse by bacteria which develop to meet a particular need. If there is a maitor change in diet, the bacterial population will change, but this take time. Within the gut, cereal-based foods tend to form a mass like bread dough, which the digestive juicer have difficulty in penetrating. Digestion is more efficient if cereals are mixed with roughage. Ingestion: Horses graze by cropping the pasture close to the roots with their incisors.

Clinical examination of a horse

A physical examination of a horse should be conducted in a manner similar to that adopted for species:

1. The age of the animal under investigation should be considered first. E.g. joint-ill in foals, epiphysitis e.g joint yearlings, pulmonary emphysema and myoglobinuria in older horses.
2. The status of a mare should also be considered i.e. pregnant, barren or recently covered by the stallion.

3. Case's history is one of the acts a practitioner must learn and keeping case notes and records is valuable.
4. Management obviously plays a large part in many conditions encountered in equine farm practice.
5. Change in behaviour may be pathognomonic for disease and particular conditions. Dullness (reduced activity), uneasiness (increased activity).

Handling of horses:

1. It is customary to approach them from the left side.
2. Restraint in the form of a twitch on the nose or neck skin may be appropriate.
3. Sudden movements, intolerance or under roughness should be avoided.
4. When handle a fractions horse it is helpful to group a fold of skin on the neck.

Hypodermic injection:

Horses are more likely to react to hypodermic injections than are other species:

1. Intramuscular injections should be made direct into a muscle mass e.g. hind-quarters muscles, neck or brisket. If the neck is used it is advisable to avoid injecting into the ligamentum nuchae. In very young foals the triceps muscles may be used, and some clinicians prefer these muscles in older horses.
2. The site of injection should be cleansed with spirit or the hair clipped.
3. We prefer a gauge 19 or 21 for I/M or S/C injection and a gauge 16 or 19 for I/V ones. In adults a length of 3 cm is preferable, inserted to the hilt, in foals it should be about 2cm.

4. The operator should avoid moving the needle once it is inserted into the muscles if there is hemorrhage, a fresh site should be selected.
5. Intravenous injections are made easily into the large jugular vein. A thumb should be pressed into the lower aspect of the jugular furrow, which visible “raises” the vein. A disconnected hypodermic needle is then placed into the vein, either by one quick direct motion or by slow gentle pressure through the tissues. Ideally, the needle should be placed in the vein in the direction of the heart.

Passing a stomach tube:

Administering drugs or fluid through a tube inserted into the esophagus is important in equine therapeutics:

1. The tube may be plastic or rubber and its external diameter should be about 3cm for adults of large breeds, 2cm for ponies, and 1cm for young foals.
2. The distal end should be blunt and the proximal enlarged to receive a funnel stem or pump nozzle.
3. The tube should be lubricated with oil or water and introduced into the left or right nostril with an attendant restraining the horse on the opposite side to the operator.
4. It may be necessary to depress the tube with the forefingers of the passing hand so that it slips into the ventral meatus beyond the tubinate bones.
5. With the distal end in the pharynx it may be necessary to flex the horse's head to ensure that the tube is swallowed.
6. As the tube enters the esophagus the increased resistance felt by the operator indicates that the tube is not in the trachea. The trachea may be shaken, laterally, and if the tube is inside it will be heard and felt

to rattle. The horse often, but not always, coughs when the tube enters the trachea.

7. With the tube in the oesophagus, the operator may blow and observe that wave of air passing down. This procedure also demonstrates that the tube has not become buckled, when it must be withdrawn and reinserted.
6. The tube should be passed to the entrance of the chest and it is helpful to have a mark on the tube coinciding with the level of the nostril when the tube is in situ.
7. The end of the tube can be felt as it passes down the neck; stomach sounds of fluid can be heard at the proximal end of the tube.
8. The tube should be passed to the entrance of the chest and it is helpful to have a mark on the tube coinciding with the level of the nostril when the tube is in situ.
9. The end of the tube can be felt as it passes down the neck; stomach sounds of fluid can be heard at the proximal end of the tube.

On withdrawal of the stomach tube:

1. The proximal end should be sealed to prevent escape of fluid in the pharynx and nasal passages.
2. The tube should be withdrawn slowly as the distal end leaves the oesophagus to avoid abrupt contact with the turbinates which may cause hemorrhage. Bleeding may also occur on insertion of the tube scrapes the nasal or pharyngeal mucosa or if it is driven against the turbinates.

N.B.:

If the tube is difficult to pass, it is usually due to the distal end entering the pharynx in a position from which it is not easily swallowed. In this case the head should be flexed and/or the tube passed through the opposite nostril.

Physical examination of a horse

It should be conducted in a manner similar to that adopted for other species. Temperature, respiratory rate, heart rate, pulse quality, quantity and quality of feces passed and appetite should be noted.

Temperature

The determination of internal body temperature is of great importance in diagnosis and prognosis of the disease. Clinical thermometer be used.

	Range of body temp °C	Average
Horse (adult)	37.2-38°C	37.6°C
Foal	37.5-38.6°C	38°C

- Rectal temperature may fall to 37°C immediately after delivery, but normally recovers to 38°C by age one hour.
- The normal range in the 1st four days post-partum is 37.2°C-38°C. the exact mechanism of thermoregulation in shivering (in the first three hours after birth), muscular activity associated with efforts to stand for the first time, and subsequently active movements following the more. So, foal like the lamb and piglet, shivers vigorously soon after birth. Heat is lost by radiation, conduction, convection and evaporation.

Pulse

Pulse should be taken before performing any painful manipulation that will cause reflex acceleration of the pulse rate. The foal's arterial pulse can be detected conveniently at the facial artery as it passes over

the inner aspect of the elbow joint and the digital artery on either side of the posterior aspect of the fetlock joint.

- The normal pulse is only just detectable but can be felt.
- Its character may change markedly in stages of cardiovascular dysfunction, becoming abnormally full, bounding or hammer-like, or weak, thread-like and failing.

Jugular pulse:

- Marked venous pulse or engorgement of jugular vein are signs of right heart failure.
- False: Jugular pulse occurs in lean animals.
- Jugular pulse is not present in a healthy foal.
- Jugular and S/C veins are not normally engorged.

Pulse rate/minute

Horse (year ling) 28 –40

Respiration

The onset of breathing:

The stimuli for the first breath and subsequent rhythmic respiratory movements following delivery are tactile, cold, and chemical (decreasing PaO₂ and increasing PaCO₂).

- The foal may gasp as the chest being delivered, but the onset of respiration and the establishment of rhythmic movement of the chest and abdomen is usually established within 30 seconds of the hips passing out of the birth canal.

Respiration is carried out by 2 main steps:

1. Inspiration: Means entrance of air inside the respiratory passage and this depends on the internal and external intercostal muscles and diaphragm.

2. Expiration: Means expulsion of air outside the respiratory passages and this depends on the relaxation of contracted muscles.

Type of respiration: Costoabdominal in which both abdominal costal muscles are similarly sharing in respiratory movement.

Abdominal type of respiration:

1. Wholly abdominal type of respiration in case of pleuritis because the horse can not utilize the costal muscles in respiration due to pain caused by movement of thoracic wall.
 2. Double expiratory movement in case of chronic emphysema in this type the first respiratory movement is normal in type (costo-abdominal) while the second one is wholly abdominal.
 3. Wholly costal in case of paralysis or rupture of diaphragm, peritonitis because the animal unable to use abdominal muscles in respiration due to pain.
- When counting respiratory movement we must observe the following:
 1. rate means # of respiratory movement/minute.
 2. rhythm
 3. Depth (quality)
 4. Type or character

NORMAL RESPIRATORY

Range /minute

type

Horse

10-14

costo-abdominal

Area of percussion and auscultation of lungs:

- Dorsal border: extends from poster angle of the scapula caudally to the last 2nd inter-costal space parallel to the vertebral column.

- Anterior border: extends from posterior angle of the scapula and downwards to the point of elbow joint.
- Ventral border: extends from the last 2nd intercostal space ventrally and anteriorly cutting the 11th rib.

Examination of superficial lymph nodes

Lymph nodes are located along the course of lymphatic vessels, act as filters

Musculoskeletal disorders

I. Epiphysitis:

Consists of swelling of the distal end of MC₃ or MT₃ in the yearling. These swellings are sometimes hot and painful in the acute phase and the animal may be lame.

II. Angular limb deformities

If retarded bone growth or fusion occurs eccentrically on the growth plate, angulation deformities may occur. These deformities are quite commonly seen in thoroughbred foals. The condition may be present at birth or may appear in older foals following “epiphysitis” or when a healthy limb bears excessive weight due to prolonged lameness on the opposite limb. The condition is usually seen as a lateral angulation of the limb from the carpus.

III. Epiphyseal injuries:

Diagnosis can only be made radiographically and these examinations should be performed in all cases of joint enlargement in young foals.

IV. Hyperflexion of the cornopedal joint:

This condition is seen in thoroughbred, hunter, arabian, and pony foals and involves both sexes. The onset is often involves rapidly growing foals in very good condition. The onset of symptoms is rapid, the heel using off the ground within 24 -48 hours.

V. Nutritional muscular dystrophy (MMD):

The incidence is low and the condition occurs in all breeds and both sexes but mainly in young horses. The cause is thought to be vitamin E and selenium deficiency. Clinical signs include stiffness, lethargy, and painful S/C swellings on the nuchal crest or abdomen. Affected foals may have difficulty in standing and small owing.

VI. Osteochondrosis

Defects in endochondral ossification and associated abnormalities in cartilaginous growth may occur at various penaiticular sites.

VII. Infective arthritis (Joint-ill, navel – ill):

Lead poisoning may result from the ingestion of concentrates of grass contaminated by paint. Most of the lead absorbed from the alimentary tract passes via the portal circulation to the liver. Signs include loss of weight, swelling of the limbs, gradual paralysis of the head and a characteristic shortness of breath or rearing caused by paralysis of the lingual muscles continuous ingestion of lead over a long period may cause a blue/black line in the gums.

Large doses of zinc salts produce acute sings of metal poisoning (i.e. purging, abdominal pain, and collapse).

Examination of the digestive system of equines

1. An introduction of the gastrointestinal tract:

The over –all functions of the gastrointestinal tract are to assist in the preparation of nutrients for digestion, to digest nutrients, and to absorb products of digestion so that may be utilized in the general metabolism of the animal.

The gastrointestinal tract also functions as an excretory organ through which many of byproducts of body metabolism are eliminated from the body.

The gastrointestinal tract functions as an endocrine organ because it produces materials which enter the blood stream and directly influence other operations.

Diseases of the digestive system are of frequent occurrence in domestic animals.

1- The first steps to examine the digestive system are the observation of the appetite of the animal. We must distinguish between anorexia and inability to take food due to difficulty of prehension or as normal horses use the two lips and incisors in prehension of food.

2- The character of faeces is of importance.

3- The abdomen may appear empty, normally full or distended. Distension of the abdomen may arise from food, foetus, fluid, faeces, foreign body, flatulence and fibroma.

Disease involving the digestive tract are probably the most common encountered by the veterinarian, many diseases can be accurately identified by a thorough physical examination where as others can only diagnosed with the assistance of radiographic examination whereas

others can only diagnosed with the assistance of laboratory procedures and radiographic examinations.

Whenever an animal is examined for involving the gastrointestinal tract, it is extreme important that a through history to be taken.

The essential parts is such a history should include:

1. Duration of illness
2. Rate of onset
3. Effect on appetite
4. Character of feaces
5. Types of diet
6. Immunization history
7. Previous illness and treatment

Question regarding the diet include:

1. What is the diet?
2. were there any changes in the diet immediately before or during the disease?
3. if the diet was changed, did this have any effect on the clinical signs, does the animal have access to food other than given by the owner 4-15. the animal confined or does it run free before proceeding to the clinical examination.

II. Clinical Examination of the digestive system includes the following points:

A. Examination of the oral cavity

1. A mouth speculum should be used when examining the oral cavity. Occasionally the animal must be sedated before the examination.
2. inflammation of the oral mucosa may be caused by infectious, chemical or physical irritants.
3. color changes of the oral mucosa may be associated with jaundice or vascular changes (hyperemia, hemorrhage).

4. excessive salivation sometimes occurs in painful inflammatory states. The presence of pus or blood in the saliva is a sign of purulent or hemorrhagic inflammation or injuries of the oral or pharyngeal mucous membranes.
5. the tongue should be examined for injuries, swelling due to cellulitis and neoplasms. Prolapse and paralysis of the tongue may be caused by paralysis of the hypoglossal nerve as well as central paralysis. Myogenic paralysis may follow tongue injuries, hyoid bone fractures or glossitis. Extension of the tongue is an idiosyncrasy of horses that is not necessarily abnormal, but may also be prompted by dental defects or glossal paralysis.
6. when inspecting the teeth, the examiner should note overall abnormalities of dentition (shear mouth, step mouth wave mouth, parrot mouth, crossbite) as well as disorders of individual teeth such missing teeth, entrapped food material, tooth length irregularities, chipped and fractured teeth, lateral deviations, and the presence of pits and cavities caries, excavations).
7. enlargements or tumors on the palpable portion of the jaw should also be noted. The lower jaw is examined for injuries, contusions, as well as bony swelling. Deformities of the jaw can occur as a result of fractures, and neoplasms.
8. Swellings in the mandibular area, combined with mastication abnormalities and atrophy of the masseter muscle, are symptomatic of a chronic inflammation of the temporomandibular joint.
9. Examination of the oral cavity should include assessment of the mouth odor. A characteristic carious smell is noted in the presence necrosis of the bone. An acrid, sweet or putrid odor is a sign of pharyngitis or the presence of food water lodged between the teeth an check.

10. often in the horse, the upper molars will have sharp edges on the buccal side, while the lower molars will be sharp on the lingual side, as a result of the natural disparity in jaw width. This can result in mucous membrane injury and ulceration which likewise produces a sweetly stale odor.

B. Examination of the pharynx

Mentioned in the examination of the respiratory system.

C. Examination of esophagus

1. Difficulty in swallowing or regurgitation of food may indicate oesophageal involvement as trauma or choking.
2. If the oesophagus is obstructed by a foreign body in the cervical portion, this foreign body can be palpated on the left side of neck. If in the thoracic portion of the oesophagus, the obstruction may be located by passing the stomach tube. By noting the length to which the tube has penetrated when it reaches the obstruction. It is possible to estimate the approximate position of the obstruction. It is possible to estimate the approximate position of the obstruction.
3. In case of acute oesophagitis, palpation of the left side of neck indicate swelling, hotness and pain.

D. Examination of abdomen

1. Examination of stomach:
 - a. Palpation of the horse stomach is not possible. No positive evidence found by rectal examination in gastric disorders of the horse. Such

negative information is however of value in the differential diagnosis of acute colic of the horse.

- b. Depraved appetite (pica) is a symptom commonly associated with chronic indigestion in the horse.

2. Intestine:

1. External palpation of the abdomen is of very limited value in the horse, but pain and tension are revealed by palpation.
2. Percussion is of value in demonstrating resonance due to tympany.
3. Auscultation of the abdomen will show the peristaltic sounds in normal animals. Abnormal loud peristaltic sounds may indicate increased peristaltic activity (diarrhoea). The decrease or absence of peristaltic sounds indicate intestinal stasis (constipation).
4. The horse normally defecates several times a day. The character of the faeces varies according to the food stuffs. The main points to be observed in regard to the character of the faeces are (consistency, colour and smell).

E. Rectal examination

1. The animal must be well restrained. One attendant must rise the foreleg, another raise the tail, application of twitch is sometimes useful to quieten the animal.
2. Hand and arms should be thoroughly lubricated with soap and water. It is a good plan to fill the edges of the finger nails with soap. The fingers must be introduced in a cone-shape through the anal sphincter. We must proceed the examination easily unless the manipulation causes pain.
3. Backracking of faeces from the rectum if the rectum is filled with faeces. Artificial ballooning of the rectum may be produced by the

repeated introduction and withdrawal of hand and arm during the removal of faeces from the rectum.

4. Many of the portions of the bowel can only be clearly defined by palpation. When they are distended with gas or impacted. The small colon can be palpated easily lying anterior and ventral to the rim of the pelvis. In obstructions of the small colon, the fecal balls may range from the fist-to coconut-size.
5. In many normal horses, portions of the dorsal and ventral loops of the large colon and the pelvic flexure are palpable. The pelvic flexure of the colon may be the site of impaction, passing the hand forward and to left you can feel it. To the right extending from the posterior part of the lumber region in an anterior and ventral direction is the mass of the caecum.
6. As far as can be reached in the lower part of the abdomen; coils of the small intestine can be felt as cord like structures transversing the abdomen.

Examination of the respiratory system of equines

Investigation of respiratory disease should be carried out according to the following pattern.

1. History taking:

Because the veterinarian can not obtain direct information concerning subjective symptoms,. The history obtained from the owner is of utmost importance, the informations should be based on such questions as:

- 1- Has the patient a cough? If so, is it productive or unproductive?
- 2- Has there been a nasal discharge? If so, what is its character? (serous, mucoid, purulent, blood stained.....ect.....).

- 3- Has there been haemolysis, either in the presence of nasal discharge?
- 4- Has the animal wheeze?
- 5- Is the breathing more rapid?
- 6- Is it apparently more difficult? difficult? (dyspnea)
- 7- Questions should be asked about previous illness, particularly those of infectious nature (past-history)

2. Examinations procedures:

A) Examination of the nasal cavity and paranasal sinuses:

- 1- External inspection will disclose thickenings and swellings of the skin in the area of the nasal inlet visible swellings in the area of the nasal bones. Frontal bones, maxillary bones and zygomata may be caused by cellulitis, fractures, empyemas or neoplasms of the nasal, frontal and maxillary sinuses.
- 2- Chronic unilateral nasal catarrh is of considerable clinical importance. It may denote various pathologic states, depending on the quantity, color, consistency and odor of the discharge. A unilateral purulent, fetid, and discolored discharge which empties rapidly when the head is lowered is characteristic of empyemas of the maxillary sinus or guttural pouch.
- 3- Palpation of the outer wall of the maxillary and frontal sinus is usually done to ascertain localized temperature elevation, tenderness, and the consistency of the various swellings.
- 4- Percussion with the fingers or percussion hammer elicits sounds that can be useful diagnostically. In healthy animals, the percussion sound is clear and loud. If the maxillary sinus is filled with exudate, tissue or a cyst, a dull sound is elicited it is important to note, however, that percussion sounds vary even

under normal circumstances depending on the age of the animal, the thickness of the skin and the momentary jaw position. Since small collections of fluid are often insufficient to muffle the sound, negative percussion findings do not necessarily mean that the sinuses are healthy. In percussion studies of the maxillary sinuses, the findings on one side must be compared with those on the other. The findings are diagnostically significant only if marked disparities are present.

- 5- The examination of the nasal cavity and paranasal sinuses is generally combined with examination of the lymph nodes of the throat region. Their form, size, consistency, and tenderness are noted, as well as their resistance to passive movement.

N.B.:

In examining the nasal region, attention is given to the area around the nasal opening, movements of the nostril, respiratory sounds, expiratory air, nasal discharge, the color of mucous membranes, and paranasal sinuses. The large, flexible nostrils of the horse give them a mobility that is distinctive compared to other species.

In inspiratory dyspnoea there is a forced dilatation of the nostrils during inhalation; with expiration the nostrils return to their normal position .

7. The nasal mucosa is accessible to direct visual inspection in the lower third of the nasal cavity. At the junction of the skin and mucosa, the openings of the nasolacrimal canals are clearly seen on the arch of the nasal fossa. Whenever nasal discharge is present, it should be determined whether, it originates entirely or in part from the conjunctival sac, escaping from the nostrils via the nasolacrimal

canals. The principal changes of the nasal mucosa include pallor, congestion, petechiae, erosions and ulcerations.

8. A rhinolaryngoscope (with flexible fiberoptic endoscope) is also useful for examining the nasal passages and mucous membrane in the horse.

B) Examination of the pharynx:

Examination of the pharynx in equines is made by two techniques:

1. External palpation: External manipulation of the pharyngeal region will show if there is local pain, heat, swelling and possibly inflammatory lymphatic glands may cause snoring respiration. When palpating the pharynx it is always well to palpate the associated lymph nodes, notably the submaxillary, the sub-parotid and the subpharyngeal.
2. Internal palpation of the pharynx: the entire pharynx can be examined in the sedated horse with the aid of a mouth speculum. This examination is useful for revealing foreign bodies and neoplasms as well as for ascertaining the size of the pharyngeal lymph nodes. In healthy animal, insertion of the hand into the pharynx will evoke a strongly swallowing reflex (contraction of the pharynx followed by swallowing movements). This reaction is weak or absent in the pharyngeal paralysis, compressive lesions, local suppuration, and botulism cutaneously in the upper cervical region and is also palpable during examination of the pharynx.

C) Examination of the Guttural pouch

1. Diseases of this organ (usually inflammatory or purulent in nature), can cause swelling of the upper cervical region in the area of the parotid gland.
2. Severe swelling of both guttural pouches can cause respiratory distress and difficulties in swallowing. The swelling, which is often

unilateral, is soft and cushion-like to the touch; sometimes a splashing sound is heard on palpation.

3. With the aid of a rhinolaryngoscope, the opening of the guttural pouch can be directly observed. an endoscope with an angled tip can be passed into the guttral pouch cavity.
4. Radiographic examination can also provide useful information on the condition of the guttral pouches.

D) Examination of the larynx:

1. During the external examination, the laryngeal area is palpated to check for circumferential enlargement, tenderness, and the ease with which a cough is elicited.
2. In healthy animals, auscultation of the larynx discloses sounds that are similar to those heard over the bronchial regions.
3. In animals with laryngitis or with tumors or laryngeal paralysis. There are extraneous inspiratory sounds that may be characterized as whistling, roaring, hissing or wheezing.
4. In glottic stenosis the laryngeal sounds are whistling (stenotic) in character. In such cases a vibration (laryngeal fermitus) can be felt by pressing on the skin over the larynx.
5. Constriction of the lumen of the larynx may be edematous or allergic in origin, or may be caused by acute inflammatory disease.
6. In the clinical examination for laryngeal paralysis, the open hand is placed into one side of the larynx, while the fingertips of the other hand press inward on the larynx on the opposite side. If laryngeal paralysis is present, this will elicit an abnormal inspiratory sound caused by narrowing of the rein a glottis. Stenotic sounds from laryngeal paralysis occur only during inspiration, because only in this

phase, does the paralysed arytenoid cartilage and vocal cord prolapse into the laryngeal lumen to produce the narrowing.

Laryngoscopy:

1. The laryngoscope consists of tube about 76 cm long which is equipped with an optical system and light source.
2. The laryngoscope is inserted through the ventral nasal passage of the immobilized horse.
3. The examiner holds the protruding portion of the instrument firmly in his hand while simultaneously grasping the medial nasal wing.
4. With this instrument it is possible to examine the nasal concha, larynx, guttural pouch openings and soft palate can also be viewed. The larynx is visible at the base of the pharyngeal cavity, the epiglottis, arytenoid cartilages, vocal cords, lateral ventricles and parts of the trachea can be visualized.
5. In laryngeal hemiplegia (roaring) the vocal folds (cords) and larynx appear asymmetrical, and the mobility of one or both vocal cords is lost.
6. In catarrhal laryngitis the mucous membrane is reddish –gray in color and has a heavy mucous coating. Edema in this region is characterized by indistinctness of the laryngeal contours.
7. With the tip of the laryngoscope positioned above the larynx, the instrument can be rotated 45° to the right or left view the entrance of the guttural pouch (eustachian tube) lying as a vertical fold in the pharyngeal wall.
8. In suppurative diseases of the guttural pouch, there may be a purulent discharge from the ventral commissure of the orifice.

E) Examination of the trachea:

1. The cervical portion of the trachea is examined by inspection of the overlying skin and coat, which will reveal changes in shape and position, scars, or tracheotomy wounds, also by palpation, which is valuable in detection of pain, local swellings, or deformities.
2. Radiography of the orahial thoracic area will confirm the clinical diagnosis by revealing the diameter and size of trachea within the thorax.
3. Bronchial sounds are usually heard by auscultation over the trachea, they are somewhat greater at this position.
4. Most rales indicate the presence of mucus, blood, exudate or other fluid in the trachea.
5. Tracheal rales are detectable in tracheitis and bronchitis and bronchitis.
6. Radiography provides conclusive evidence as the presence of neoplasms and the shape, position and course of the larynx and trachea.

F) Examination of the lungs:

1. Percussion of the chest wall makes it possible to define the position of the normal lung and detect abnormalities by eliciting various percussion sounds (resonance). Percussion of the lung is generally done by the hammer-pleximeter method, but finder-finger percussion may also be used. A narrow, spatula-like instrument with a contact width of 8-10 mm makes an excellent pleximeter. The percussion hammer should have a weight of 50-70gm and be fitted with soft rubber cap. The following guidelines are recommended for examination technique.

- Very gentle tapping induces vibration of the lung tissue below the chest wall.
- Percussion should keep strictly within the intercostal spaces.
- The contact pressure of the pleximeter should be as high as possible.
- Strictly intercostal percussion can be achieved only with a narrow pleximeter.

If pulmonary percussion in the healthy animal is begun in the dorsal region of the thorax in the manner described, the first sound to be heard is a characteristic loud, full resonant sound. A dull sound is obtained when air spaces are displaced by tissue or fluid, while percussion the presence of excessive air gives hyperresonant sound. When percussion is carried out in the ventral region of the thorax, a point is reached where the sound quality changes, becoming higher, softer and shorter. This point forms a portion of the caudoventral lung boundary. As percussion is carried farther ventrally, a zone of increasing dullness about 3-5 cm wide is demonstrated. This zone of relative dullness is bounded ventrally by a point beyond which the dullness is absolute. If points of similar sound quality are connected along the individual intercostal spaces, the following boundary lines are obtained: An upper line which is straight for three quarters of its length and turns dorsally in its final quarter. Forming an obtuse angle with the straight portion, and a lower line, which is curved for its full extent. The upper, angled line, is useful diagnostically. For example, with the elasticity loss that occurs in moderate cases of chronic obstructive pulmonary disease, (COPD) the obtuse angle becomes smaller, so that the angled limb approaches a perpendicular. In more advanced cases of COPD the angled boundary line is replaced by a deformed line that is curved through.

The anatomical reference points used in the literature for defining the literature for defining the lung borders (tuber-coxae, tuber ischii, point of shoulder) relate to the aforementioned boundary level absolute dullness. Due to the individual variability of the reference points, however, this level is no longer recommended for diagnostic purposes. Another phenomenon that has diagnostic applications is the zone of hyperresonance. In work horses and in athletic horses, this zone occupies an area of 3-4 fingers breadth at the edge of the lung field, dorsal to the caudoventral lung boundary. It expresses the increased air content of the alveoli at the pulmonary border. Finally zones of dullness can occurs in the lung field either alone or combined with symptoms of elasticity loss.

2. In the normal horse; on auscultation, using the suitable stethoscope, the soft, gentle vesicular sound is audible at rest only during the inspiratory phase. Expiration is physiologically silent in the adult horses. If the sharper, harsher bronchial sound is heard over the chest wall during inspiration and especially during expiration, abnormal conditions are assumed to exist in the lung area. This sound which occurs in the larynx, trachea, and main stem bronchi during each respiratory movement, becomes audible in the lung is accentuated due to pathologic congestion of the alveoli with secretions as in pneumonia or edema. Inter-mediate between the vesicular and bronchial breath sounds is the increased vesicular sound, which is especially pronounced in chronic bronchitis. It is about as sharp as the bronchial tone, but is heard only during inspiration. Louder rales and rouchi are caused by secretion accumulation in the bronchial space (bronchitis, bronchopneumonia, allergies). Soft crackling heard during inspiration emphysema.

Examination of the urinary system

Diseases of the urinary system in equine occurs more frequently. Diseases of bladder and urethra are common in equines and of greater importance than diseases of the kidney.

Clinical examination of the urinary system

The principal clinical signs arising from diseases of urinary system include three main categories:

1. Those associated with the act of micturation, they include (frequency, abnormal posture, and evidence of pain).
2. The signs which can be determined by physical examination of urinary system.
3. Those symptoms and signs caused by the defects in excretion, metabolic disturbances and toxæmia.

Micturation

1. Posture:

Horses as a rule urinate only at rest, the posture normally adopted by both sexes is that the hind legs are separated and the animal appear to press forward slightly and exert pressure by contracting of the abdominal wall.

Any alteration in the posture adopted for the act of urination must be regarded as evidence of abnormality.

2. Frequency: In normal animals the frequency of urination depends upon the quantity of water consumed and the amount lost by respiration and perspiration and defecation. Horses urinate 5-6 times daily. An increase

in the frequency of urination may be due to a greater volume of the urine (polyuria). This occurs abnormally in diabetes insipidus. Increased frequency of urination without increase in urine volume occurs when alteration in the character of the urine render it irritant to the mucous membrane of the bladder and urethra, such alterations occurs in acute nephritis, cystitis irritation of the bladder may also arise from the presence of calculi.

Abnormally infrequent urination may be due to a reduction in the amount of urine (oliguria) and in all those conditions in which there is retention of urine. oliguria may be due to increased loss of fluid as incase of dehydration, diarrhoea.

3. Straining: It is seen proceeds and accompany the passage of urine and occurs in urethral obstruction, also it may due to colic accompanied with frequent urination.
4. Pain and dysuria: Diseases of the urinary tract may cause sufficient discomfort so that the animal show signs of abdominal pain and dysuria. Acute abdominal pain, exhibited by depressing the back, paddling with hind feet and kicking of the abdomen, painful urination is seen in case of cystitis, vesical calculus, urethral obstruction and urethritis.

Physical examination of the urinary system:

In equines the kidneys, urinary bladder, and ureters are examined by rectal examination.

Kidneys: Because of the considerable thickness and rigidity of the abdominal wall in equines, the kidneys can not be located by external palpation.

Internal palpation of both kidneys may be achieved during rectal examination in small horses, whereas the caudal border of the left kidney only palpated in this way in horses of medium size. In horses

the ureters are not palpable during rectal examination. During palpation of kidneys we must to assess:

1. Location;
- 2-size;
3. Shape
4. Character of the surface;
5. Consistency

Enlargement of kidney may be due to neoplasia, hydronephrosis of certain forms of nephritis. Palpation of the kidneys revealed that chronic renal disease is characterized by an almost complete absence of pain arising in acute renal disease. Renal colic is most common due to obstruction of ureter by calculus that entered the ureter from the pelvis.

Bladder: Diseased conditions of the bladder are accompanied by increased frequency of urination, evidence of discomfort during or after micturation (dysuria), change in urine and the signs determined by physical examination. In equine, it is possible to palpate the bladder per rectum and can be determined the degree of distension and existence of pain in the bladder when it is manipulated. Over distension of urinary bladder occurs in urethral obstruction by calculus.

Urethra

Obstruction of urethra is manifested by distension of the bladder and frequent attempts of micturation. In equines the passage of a catheter is the only satisfactory method of investigating the condition of urethra. In examination of the urethra of the male an inspection of the prepuce and penis should always be made. Obstruction of preputal opening, phimosis and paraphimosis prevent the passage of urine, such conditions are immediately recognized on inspection of the parts.

Special examination of the urinary system

1. Catheterization;
- 2- analysis of urine;
3. Renal function tests, and

4. Radiographic examination.

Methods of collection of urine

1. By inserting the hand and fore arm in the rectum and compressing the bladder against the pelvis thus forcing out the urine.
2. During urination as the animal void it.
3. By catheterization.

Examination of the cardiovascular System of equines

The cardiovascular system is composed of two main functional units; the heart and the blood vessels. Both maintain the circulation of blood and ensure a normal exchange of gases, electrolytes and fluids. The autonomic nervous system controls both components.

Anatomic relationships:

- 1- In the horse the heart occupies an asymmetrical position; a little more than half the organ lies to the left of the median plane.
- 2- The left ventricle is in contact with the chest wall in an area extending from the 3rd to the 6th rib while the right ventricle, comes into contact with the chest wall from the 4th to the 6th rib.
- 3- The right atrioventricular orifice (tricuspid valve) lies opposite the 4th intercostal space, about 7.5 cm above the lower end of the 4th rib.
- 4- The pulmonary orifice (pulmonary semilunar valve) lies opposite the 3rd intercostal space just above the plan of the atrioventricular orifice.
- 5- The left atrioventricular orifice (bicupid valve) is located opposite the 5th intercostal space, about 10 cm above the sternal end of the 5th rib.
- 6- The aortic orifice (aortic semilunar valve) lies opposite the 4th intercostal space, level with the point of the shoulder.

Examination of the heart:

(A) ***Inspection:***

The visible expression of the cardiac action is the movement of the chest wall during systole by the “ apex beat”. This beat is also observed in healthy animals, but it is more pronounced when cardiac activity is increased (over-exertion, anaemia).

(B) ***palpation:***

The strength and size of the cardiac impulse can be estimated by placing the palm of the hand into the cardiac area. The apex beat is felt with the tip of one finger. The heart beat is not palpable if the heart has been forced away from the chest wall such as would occur in pericarditis, pleuritis or hydrothorax.

(C) ***percussion:***

- 1- This is done in the same way as described for the lung, usually the heart and the lung are percussed at the same time.
- 2- Percussion is always carried from areas of increased resonance to areas of dullness.
- 3- The area of absolute cardiac dullness.3th area of absolute cardiac dullness in the horse covers an approximately palm-size area on the left chest wall and lies behind the shoulder, above the line of the elbow, in the area of the 3rd and 5th intercostal space, the area of cardiac dullness is considerably smaller than on the left.
- 4- On the right side of the chest.
- 5- The area of cardiac dullness is extended in cardiac enlargement, fluid distension of the pericardial sac, and lateral displacement of the heart (unilateral pneumothorax). This area is reduced in chronic obstructive pulmonary disease (COPD).

(D) Auscultation:

- 1- By careful auscultation, useful information can be gained on the functional state of the heart.
- 2- The auscultation is carried out with the aid of a stethoscope. The aim is to determine the character of the heart sounds and to detect the presence of abnormal sounds.
- 3- Points to be noted are the number, rhythm, intensity, and quality of heart sounds; abnormal sounds must be related to the functional activity of the heart.
- 4- The first heart sound is dull, loud and prolonged. It is immediately followed by the second heart sound, which is shorter and higher-pitched.
- 5- In the horse a third heart sound, which is short and quite soft, is audible at the start and quite soft, is audible at the start of diastole: the mechanism of this sound remains unclear. Unnatural loud heart sounds are associated with cardiac hypertrophy and anemia. The intensity of heart sounds are associated when cardiac performance is impaired (advanced cardiac insufficiency). An accentuated second heart sound is generally the result of increased blood reflux against the closed valves. The second sound is weakened when the arterial pressure is low splitting of the first and second heart sounds can occur in normal horses as well as in animals with elevated blood pressure splitting of the second heart sound results from a synchronous closure of the semilunar valves.
- 6- Further goal of auscultation is to evaluate the cardiac rhythm, which has a regular cyclic form in most normal horses. The rhythm is influenced to a slight degree with respiration.
- 7- The importance of cardiac arrhythmias can be ascertained and diagnostically evaluated by means of electrocardiography. Auscultation of the heart before and after exercise provides the clearest indication of arrhythmias, which become more clearly audible after exertion.

Extraneous heart sounds. Abnormal sounds may replace or accompany one or both of the normal sounds. The extraneous sounds that originate within the heart itself are caused by valvular lesions (vegetative endocarditis or valvular adhesions), valvular insufficiency and abnormal orifices (ventricular septal defect, patent ductus arteriosus). These murmurs may be described by terms such as hissing, humming, buzzing, or vibrating. Thus, the murmur of stenosis is harsh and buzzing, while that associated with valvular insufficiency has a softer, hissing quality. Endocardial murmurs are caused by chronic valvular endocarditis, cardiac dilatation, acute endocarditis and neoplasms. Endocardial murmurs may be systolic as well as diastolic systolic murmurs indicate either stenosis of the semilunar valves or insufficiency of the atrioventricular valves. Diastolic murmurs are caused either by stenosis of the artioventricular valves or by semilunar insufficiency.

(E) *Blood pressure:*

Blood pressure measurement has not become a routine procedure in the clinical examination of the horse. The blood pressure can be measured indirectly by applying a cuff to the root of the tail.

(F) *Electrocardiograph:*

While ECG can not replace the clinical examination, it can nevertheless enhance the diagnosis of certain functional cardiac diseases. ECG studies permit an accurate determination of the hearth rate and cardiac rhythm.

(G) *phonocardiography:*

this is a technique for the graphic recording of heart sounds. The apparatus includes a timing system for recording a pulse curve and electrocardiogram.

Examination of the pulse:

An examination of the pulse can provide information on the state of the circulatory system. When the pulse is taken, its rate, rhythm and quality are noted. An elevation of the pulse rate is present in painful disorders and diseases that do not primarily involve the heart and circulatory system. It is also a principal feature of fever. The pulse rhythm is determined by estimating the time intervals between successive pulse waves. The sequence may be regular or irregular. Abnormalities of rhythm may themselves occur at regular or irregular intervals. The irregular dropping of a pulse wave occurs without obvious cause and is usually associated with irregularities of the pulse volume resulting from variation in the cardiac stroke volume. The most frequent causes of irregular pulse irregularities are extrasystolic arrhythmias and atrial fibrillation. The pulse quality depends chiefly on the amplitude of the pulse waves, which can vary because the degree of diastolic filling influences the stroke volume. The pulse quality is estimated from the degree of digital pressure required to obliterate the pulse wave in the artery.

a- Abnormalities in pulse rate:

A strongly elevated pulse rate is called tachycardia in sinus tachycardia, the impulse has its origin in the sinus node. Sinus tachycardia occurs in febrile diseases and in circulatory failure. In simple tachycardia. The impulse has its origin in the sinus node. Paroxysmal tachycardia occurs in febrile diseases, in shock and in circulatory failure. In sinus tachycardia the pulse rate rises with exercise and falls during rest.

Bradycardia (slow pulse) presents a decline in distinguish between sinus bradycardia and the form that occurs with atrioventricular block. In the

first case there is the usual rise of pulse rate in response to movement and excitement. Opinions vary as to the origin of bradycardia in horses that have undergone high-performance training.

b- Abnormalities of rhythm:

In the irregular pulse the intervals between successive pulse waves of varying length. These abnormalities of rhythm are always associated with a change in the pulse amplitude such as occurs in a trial fibrillation, atrial flutter or generalized myocarditis. In serious febrile and toxic states with increased cardiac activity, an irregular pulse may be a transitory phenomenon. An intermittent pulse is one where individual pulse waves are lost in an otherwise regular sequence. If there is a corresponding interruption of the heart beat, the pulse is said to be absent. If the heart beat occurs, but is too weak to generate pulse wave, the pulse is described as intermittent. A intermittent pulse may be found in horses in a high peak of training (sinus arrhythmia). Irregularities and interruptions can be as in the overall cardiac muscle (extrasystole).

c- Abnormalities of quality:

These are the result of variations in the stroke volume and vasomotor effects. A distinction is made between the full and strong pulse, the small and weak pulse, the soft pulse, the irregular pulse and the alternating pulse.

Jugular pulse: The jagular pulse may be observed subcutaneously in the jugular furrow. A negative jugular pulse is normal. A strong pulsation may be seen in tricuspid valve stenosis as well as in heart block and pericarditis. The positive jugular pulse consists of true pulse waves which pass from the thoracic inlet to the mandibular arch. It occur in tricuspid valve insufficiency.

Dilatation of the veins: A continuous dilatation of superficial veins is observed in all conditions in which there is an obstruction to the venous blood flow (myocardial diseases, heart block, endocarditis in the short-winded horse, for example, venous dilatation appears rapidly with exercise and persists much longer than in healthy fit individuals.

EXAMINATION OF THE CENTRAL NERVOUS SYSTEM

Deviations in the mode of behavior of an animal can be manifested in various ways. They include dullness and apathy, the degree of which can be estimated from the animal's response or lack of response, to normal stimuli. The "dummy" syndrome is the advanced stage. The terminal stage of apathy is coma, in which the animal no longer responds includes an assessment of locomotor function. For evaluation the animal is allowed to move freely or is led through various gaits and observed for motor disturbances (stumbling, swaying, hind-quarter weakness, compulsive movements). These disturbances may be continuous or transient. Diseases must be differentiated from faults and vices such as balking on leading or riding, resistance to saddling, head sensitivity, shying from certain objects, viciousness and possessiveness toward food, and weaving. Diseases of nervous system may occur as the result of certain infectious diseases including listeriosis, tetanus, rabies, toxoplasmosis, Borna disease, and herpesvirus infections. Developmental defects of the central nervous system, such as congenital hydrocephalus, can occur. Secondary diseases of the nervous system may be caused by infectious or toxic processes associated with other organic diseases.

Due to the limited responsiveness of certain parts of the nervous system, it is not always possible to deduce the nature of the disease from clinical signs alone. Diseases in which there is impairment of nervous function with corresponding symptoms, but there is no demonstrable

lesion, are functional disorders they are seen in metabolic diseases, biochemical abnormalities, and various other conditions.

The clinical neurological examination is confined to a few areas. The history will assist the examiner in narrowing the scope of his investigation. In all clinical examination of the nervous system, the observation of the animal of the animal is interactions with its environment and response to stimuli is of paramount importance. The systematic examination begins with inspection and palpation of the cranium. The spinal column is examined for deformities (kyphosis, lordosis and scoliosis). Nervous disorders are localized as central, peripheral, or autonomic, depending on whether the diseases has its sent in the brain or spinal cord or in the sympathetic and parasympathetic nervous system. Motor or sensory disturbances may be predominate, depending on the nervous component involved. An exaggeration of motor nerve activity produces the clinical picture of spasm. When motor nerve function is depressed, the result is partial paralysis or paresis. When loss of function is complete, the result is paralysis. Sensory nerve activity may also be heightened or diminished, giving rise to corresponding increases or decreases of sensitivity. Paralysis are classified as central or peripheral, depending on the anatomic location of the lesion. The central paralysis may be spinal or cerebral in origin. Peripheral paralysis affect only the region supplied by one or more nerves. The paralysis may be of the flaccid type, with as absence of muscle tension. Spinel paralysis are generally bilateral (paraplegial, their extent varying with the site and severity of the spinal cord damage. Serious injuries of the spinal cord casse immediate flaccid paralysis. Cerebral dysfunction is often accompanied by a loss of function is confined to one side of the body. In cases of muscular atrophy of muscle wasting, a distinction is made between atrophy of disuse and the degenerative atrophy that occurs in the various paralysis. Muscle

spasms are classified as tonic or clonic. A tonic spasm is one in which there is sustained muscular rigidity, it is characteristic of trismus (in case of hypo-calcemia) and tetanus. A clonic spasm is one in which the muscular contraction is followed by immediate relaxation. Tetany is marked by tonic muscle spasm, excitation and labored breathing. Tremors is a rapid succession of limited clonic muscular contractions (trebling). Abnormal movements of the eyeball (horizontal, vertical accompany meningitis and may accompany meningitis and cerebellar disease. Ataxia denotes a failure of functional coordination between different parts of the muscular system. Compulsive movements are defined as coordinated muscular movements performed in response to excitation of the motor centers (cerebral hemorrhage, intra-cerebral parasites, generalized brain disease). Abnormal movements of modes of behaviour can be caused not only by the paralysis or spasm of individual muscle groups, but also by injuries to the muscles tendons or bones. Sensory to the muscles tendons or bones. Sensory disturbances may affect the senses of touch, vision, smell, taste or hearing, abnormalities of this type are difficult to demonstrate due to the absence of subjective symptoms.

The functional state of the nervous system is assessed by determining the integrity of certain reflexes. A reflex may be absent, depressed or exaggerated when the cornea is touched, the horse should respond by blinking. Touching the palpebral conjunctive evokes a similar response. The pupillary reflex is tested by covering both eyes and then shining a flash light into one eye. Normally the pupil dilates in darkness and contracts rapidly on exposure to light. The pupil is fixed and contracted with increased intracranial pressure, cervical cord disease and cranial injury. The pupil is fixed and dilated in conditions such as retinal detachment and intoxications such as retinal detachment and intoxications (atropine, botulism). A fixed pupil (after exclusion of internal ocular

diseases) is a common symptoms of brain diseases. Cutaneous reflexes are tested by touching or gentle stabbing with a pin. The pedal reflex can be examined by stabbing the coronet. The anal or perineal reflex is tested by touching the anus. In the recumbent horse the absence of this reflex denotes a profound impairment of nervous function.

Psychic disturbances (neuroses) are not uncommon in the horse. The vices such as wind-sucking and weaving, are includes in this category. Radiographic examinations (cerebral angiography, pneumoencephalography and vent-riculography⁹ may also be performed. Electro-encephalography is used as an adjunctive method to assess the function of the nervous system for experimental studies.

Examination skin and associated structures

The skin act as the principle medium of communication between the animal and its environment.

Function of skin:

1. Maintenancy of water and electrolyte balance of the body.
2. Regulation of body temperature.
3. Mechanical protection and limitation of penetration of noxious physical and chemical agents.
4. Elaboration of vitamin D.
5. Sensory perceptivity.

The incidence of skin diseases in equine is high. It may be primary or secondary in origin:

- Primary disease: The lesions are restricted to the skin and its associated structures, spread to other tissues then may occurs as a complication.

- Secondary disease: occurs as a result of extension of a disease process from another organ or tissue. Skin diseases can be classified according to the cause into:
 - A. A parasitic skin diseases as Demodectic mange (D. equi), chorioptic mange (Choriopter equi), psoroptic mange (p. equi, p. hippotis, p. cunculi).
 - B. Non parasitic diseases includes:
 1. Fungal skin diseases: as ringworm, eumycotic mycetoma, zygomycosis.....etc.
 2. Bacterial skin diseases as ulcerative lymphangitis, botryomycosis, cutaneous form of glanders.....etc.
 3. Viral skin diseases: as pox, cutaneous papilloma, vesicular stomatitis.....etc.
 4. Nutritional skin diseases: as deficiency of nicotinic acid and biotin, deficiency of vitamin A.
 5. Allergic skin diseases: urticaria, angiodema, allergic contact dermatitisetc.
 6. Toxic or irritant chemical as arsenic, mercury, selenium, sodium hydroxide and potassium hydroxide cause dermatitis and alopecia.

Examination of skin and coat:

This include these points:

1. Condition of the coat.
2. The surface of the skin.
3. Elasticity of the skin.
4. Horny structures.

I. The condition of the coat:

Normally the hair is smooth and shiny. In abnormal conditions it is lustreless, dry and rough.

Types of abnormalities:

1. Alopecia: It means loss of hair, may be due to several factors as poisoning with mercury, and selenium. It may be also due to hormonal disturbance, malnutrition, internal parasite, and some infectious diseases as ringworm.
2. Upertrichosis: it means excessive development of hair due to hormonal disturbance and hereditary.
3. Change in pigmentation of coat: grey hair is seen in young and old white animals without any definite cause.

4. Elasticity of skin:

The elasticity of skin can be determined by holding of a fold of skin in the region of neck or back and then releasing it again in a healthy animal, the fold of the skin is easily grasped at these sites and then on release immediately flatten out again in the same manner. In diseased animals, the skin fold does not return easily to its place again or even difficult to hold. This is seen in dehydration due to diarrhoea.

3- Surface of the skin:

Absence of skin over various parts of the body surface has been observed as an inherited congenital defect occurring at birth in foals. There is complete absence of all skin layers in affected area, which vary in size and distribution.

Change in the colour and structure of the skin not only occurs in primary diseases of the skin and associated structures but may also be secondary to many systemic diseases. Absence of pigment may occur in a general or a local form and is inherited or acquired. Albinism (white skin) is a developmental or hereditary absence of melanin in the skin. Vitiligo means appearance of white colour in form of spots. Excessive pigmentation, causing the affected part to become much darker or even black, occurs in certain chronic skin disease. Bluish discoloration of the skin or cyanosis occurs when the capillaries contain venous blood as in respiratory system diseases while yellow discoloration of skin occurs in jaundice.

Skin lesions

Primary skin lesions :

1. Macule: It is a circumscribed area of discoloration of the skin which is not elevated above the level of the skin surrounding skin. These macules may be large or small, circular or irregular. It may be due to local hyperaemia. It may appear in the early stage of box.
2. Papule: is a solid elevation on the surface of the skin, vary from a pin head to a pea, caused by cellular infiltration. It appears in the early stage of pox and glanders.
3. Vesicle: a small elevation of the superficial epithelium of the skin.
4. Blister: is a larger lesion of a similar type of vesicle.

5. Pustule: Similar lesion filled with pus.
6. Wheal: is a circumscribed swelling in the skin caused by local serous infiltration and hyperaemia as in urticaria.

Secondary skin lesions:

1. Scurf or scales or pityriasis: is discarded epithelial tissue retained in the coat. Parasitic, fungal and chemical intoxication.
2. Erosion: is a destructive or breakdown of tissue. The ulcer may be large or small, irregular, elongated, shallow, deep.
3. Crust or scab: Consist of dried inflammatory exudate and epithelial debris or of blood pox.
4. Scar: Formed by proliferation of fibrous tissue at the site of the lesion.

Urine

The urine analysis is an essential part of the diagnostic work up of diseases of the kidneys and urinary organs. Because the kidneys play a critical role in the maintenance of homostasis, analysis of the urine also gives valuable information on renal disease as well as disturbances of other organs.

In the more, urine is best obtained by catheterization of the urinary bladder. In the male catheterization is possible only after the penis has been prolapsed manually or by medication, and precautionary measures are necessary during catheter insertion.

In most cases the objective of urinalysis is to confirm clinical suspicions or shed light on known metabolic disorders or impairments of organ function. In either case it is important to obtain a result as quickly as possible, even at the cost of greater accuracy, so that further diagnostic or therapeutic measures can be instituted without delay. Hence, the urinalysis is limited in most cases to a physical examination of fresh urine and the application of qualitative or semiquantitative methods of analysis. If the analysis can not be done right away, the urine specimen should be stored in the refrigerator. Formaline, boric acid or chloroform may be added as preservatives.

During the physical examination of the urine, the volume, color, odor, transparency and viscosity are noted, normal horses excrete 3-6l per day and perhaps as much as 10l. Equine urine is a viscous, much like, stringy fluid. It may be light yellow to light brown or even yellow-red in color. The odor is species-specific and is often compared to that of beef broth or rotting hay. A large amount of sediment forms within a short

time, this consists mainly of calcium oxalate, calcium sulfate and hippuric acid. In an uncapped container the superficial layer of urine soon takes on a darker color which intensifies and spreads to deeper layers.

The properties of equine urine make assessment difficult, for they may mask turbidity resulting from inflammatory urinary tract disease. Slight color changes, such as those associated with hematuria or reddish-brown discoloration following the administration of the anthraquinone laxative isstizin may also escape notice. However, hemoglobinuria and especially myoglobinuria may be so intense that they cause the urine to take on a reddish-brown color, perhaps even turning it inky black.

Equine urine has a density of 1.025-1.060 and is usually alkaline (pH 8). Values in the acidic range reflect renal compensation in response to an acidotic insult. In such cases the urine becomes clear and watery. The chemical examination of the urine is ordinarily limited to the demonstration of protein, bilirubin, and urobilinogen, hemoglobin and glucose.

The tests which can be needed for chemical examinations of equine urine were discussed before in the first part of the practical book.

If proteinuria is demonstrated, microscopic examination of the urinary sediment should follow without delay.

Glucosuria is uncommon in horses but may occur in conjunction with certain diseases of the central nervous system (borborea disease).

Tests for bilirubin and urobilinogen in the urine are important in the diagnosis of icterus. Bilirubinuria occurs only in parenchymatous and obstructive jaundice.

Urobilinogenuria is characteristic of liver parenchymal damage and hemolytic icterus.

Hemolytic diseases are also typically accompanied by hemoglobinuria. Its differentiation from myoglobinuria is best accomplished by observing the clinical picture, which is one of anemia in the case of hemoglobinuria and signs of acute muscular disease in the case of myoglobinuria. If redness of the urine and hemoglobinuria are the result of hematuria, this can be readily determined by letting the urine stand. All doubts are finally resolved by microscopic examination of the sediment. Isolated red cells test besides primary renal damage or urinary tract disease, hematuria is a consistent feature of all hemorrhagic diseases.

The microscopic examination should be carried out promptly after sedimentation of centrifugation of the sample.

Of the inorganic constituents, the crystals of calcium carbonate and calcium oxale are of diagnostic importance, although the absence of the former is considered a pathologic finding triple phosphate crystals in the fresh urine are a sign of urinary tract infection.

Other formed elements that may occur in the sediment are red cells, white cells, epithelial cells from the kidneys and urinary tract as well as various types of casts. The later in particular, underscore the presence of renal disease. Most chronic forms of renal damage are distinguished by unremarkable urinary findings, however, large amounts of epithelial cells and triple phosphate are indicative of cystitis and pyelitis. Isolated epithelial and white blood cells may also be found in normal animals.

Hematology

Blood samples are drawn from the jugular vein in the horse. Heparin, EDTA or some other anticoagulant is added to the collecting tube if the test is to be performed on whole blood or plasma. The blood samples are used in the clinical laboratory for determination of hematologic or biochemical values.

Hematologic examinations

The hematologic analysis includes an assessment of the cellular elements of the blood, specifically the determination of the hematocrit, hemoglobin concentration, erythrocyte count, leukocyte count, and differential leukocytic count.

Changes in erythrocytic parameters that are manifested by an increase in the hematocrit, hemoglobin concentration and erythrocyte count are termed polycythemia.

Most important clinically is the reason why the blood becomes concentrated. This be a result of fluid loss or as in the case of anemia, a decrease in the proportion of corpuscular elements per unite blood volume regardless of the various precipitating causes anemia always results when the breakdown of erythrocytes exceeds the maximum capacity for their production or there is a primary impairment erythropoiesis. The determination or calculation of the parameters as well as the examination of the identify the form of anemia present. Acute post hemorrhagic anemias are rarely observed in the horse because even extensive blood losses are overcome with amazing rapidity and without pronounced regenerative changes. Hemolytic

anemias are observed in infectious anemias, leptospirosis. There forms of anemia are typically accompanied by icterus, bilirubinuria and hemoglobinuria. With impaired hematopoiesis, the anemia usually has a hypochromic character and altered cell forms are observed changes in the leukocyte count may be nonspecific. Leukocytosis is a feature of many infectious or inflammatory diseases. It can be interpreted as the result of an injurious agent and the animal response to that agent. Conversely, leukopenia signals a failure of the body's defense mechanism. Severe viral infection, endotoxic shock, intoxication or radiation injury may be responsible. The changes in leukocyte count do not affect the different types of white blood cells equally. Eosinophilia may indicate parasitic infestation or allergic diseases, while eosinopenia is associated with an increase of glucocorticoid excretion. The neutrophilic granulocytes determine the white blood cell picture in the horse and are the principal agents of cellular defense. Their quantitative behaviour as well as the predominance of younger or older cell forms mainly reflect the stage of the disease. Marked lymphocytosis in the horse occurs in chronic infections such as infectious anaemia or the rarely seen case of tuberculosis or lymphatic leucosis. It may also accompany the healing phase of inflammatory disease but is then only a transient phenomenon. Very low platelets are found in hemorrhagic diathesis and disseminated intravascular coagulation syndrome.

Normal hematological values of horse

PCV	%	28 ± 3.5
RBCs	10 ⁶ /cmm	7 ± 0.7
Haemoglobin	Gm%	10 ± 1.5
WBCs	10 ³ /cmm	9 ± 1.6
Neutrophil	%	58 ± 12
Lymphocytes	%	29 ± 11
Eosinophils	%	7 ± 3.5
Monocytes	%	5 ± 2.5
Basophils	%	2

Feecal examination

Macroscopic examination:

The sample grossly examined for the presence of adult ascarids, strongyles, oxyurids and tapeworm segments. Technique: if no parasites are visible on the surface of the feecal sample, specimens are taken from various sires, liquefied with water and strained through a sieve. The sieved material is then examined macroscopically.

Microscopic examination:

- 1) Direct method
- 2) Flotation method:

For the demonstration of nematode and cestode eggs. Principle: the parasitic structures rise to the surface of a solution of higher specific gravity. Technique: A certain quantity of feces (e.g 10gm) is ground in a mortar of glass beaker, flotation solution is added (generally saturated saline solution, density 1.18), and the mixture is strained through a sieve (250-300um mesh) into a beaker (150-200ml). then enough flotation solution is added through the sieve to fill the beaker 3/4 full. The liquid is allowed to stand for 20min. then, with a right-angled wire loop (5 mm diameter) 5 drops are collected from the surface of the liquid column (1 from the center, 4 from the zone between the edge and center) and mounted on a glass slide for microscopic examination.

Sedimentation method:

The demonstration of trematode eggs and eimeria 00-cysts principle. The parasitic structures sink in water owing to their higher specific gravity. Technique: A certain quantity of feces (10 g) is mixed

with tape-water and strained through a sieve into a beaker (150-200ml). the beaker is filled close to the top with water and allowed to stand for 2 minutes. Then the water, this is done 3 times. The sediment is transferred to a flat petridish and examined microscopically.

Migration method:

The demonstration of lungworm larvae (at least 7 hours after collection) and other nematode larvae from fecal specimens e.g strongyloid and strongyle larvae.

Principle:

Worm larvae migrate from the stool into the water, unable to swim, they sink to bottom.

Technique:

A certain quantity of feces (10g) enclosed in a gauze bag introduced into a funnel glass filled with lukewarm water such that about 2ml of liquid is collected from the bottom of the funnel with a pipette and examined microscopically in a small dish.