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دراسات تمهيدية لحقن المفاصل والصرر الزلاية  
لقوائم الحمار

محمد عطيه ، جعفر عثمان

استهدفت الدراسة التشريحية تشريح المفاصل والصرر الزلاية لكل من القائمين  
الصدرية والحوضية وذلك لتحديد أنسب المداخل لحقنها مسترشدا بعلامات مميزة  
على الحيوان ثبت أهمية استخدامها في عمليات الحقن والبذل . وقد تم وصف  
طريقة الحقن في كل مفصل وصررة زلاية على حده . وتم التوصل بنجاح الى أنسب  
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تشخيص العرج وعلاجه في هذا الحيوان .

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**PILOT STUDIES ON THE TECHNIQUES FOR ARTHROCENTESES  
AND INTRA-ARTICULAR AND INTRA-BURSAL INJECTIONS**  
(With 15 Figures)

By  
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**SUMMARY**

Arthrocenteses and intra-articular as well as intra-bursal injection were investigated and experienced in both the thoracic and pelvic limbs of the donkey. The anatomical studies performed for determination of the best approaches for injection into various joints and bursae seemed to be extremely essential prior to their practical exploration in the living subjects. The sites adopted for injecting the joints and bursae were determined according to palpable external landmarks on the animal. Complete description of the techniques adopted was presented. Certain additional details and newer developments than those reported on the horse were described.

**INTRODUCTION**

Injection of local analgesics, corticosteroids or their synthetic analoge drugs, antibiotics and antimicrobials and other pharmaceutical preparations into the joints and bursae of equines is of an importance in diagnosis and treatment of equine lameness (BAUER, *et al.*, 1940; WHEAT, 1955; VAN PELT, 1926; VAN PELT and RILEY, 1968; BOLBOL and FAHMY, 1979 and BROWN and VALKO, 1980 and HALL and CLARKE, 1983).

Since nothing could be traced in a review of the literature as regards arthrocenteses, intra-articular and/or intrabursal paracenteses or injections in donkeys, the present pilot studies were initiated to explore the various techniques for injecting the more recognized poor or inaccessible joints and bursae of both limbs in such a species.

**MATERIAL and METHODS**

A preliminary anatomical study was first conducted on both limbs of 4 donkeys at the Dissecting Hall of Faculty of Veterinary Medicine, Benha University, Moshtohor, Egypt. In this study, all the trends were directed towards the dissection of all joints of these limbs as well as the bicipital and olecranon bursae. The nomenclature used was according *Nomina Anatomica Veterinaria* (1973) and its annex (1975). Thereafter, on 8 living donkeys purchased for student's exercise, 60 trials were attempted, with the animal in the standing position, to aspirate or inject the previously-dissected joints and bursae. The animals were of both sexes, different ages, and body weights. For making injections, restraint and twitching of the animals were quite suffice. At least 7 injections were tried in each animal. The sites of injection were cleaned and disinfected by routine methods. Practical application has been of primary concern.

**TECHNIQUES and RESULTS**

The anatomical dissections and their practical exploitation for the best approach for making arthrocenteses, intra-articular or intra-bursal injections in the donkey are illustrated (Figs. 1 - 15).

**Shoulder Joint :**

The greater tubercle (The lateral tuberosity of the humerus) is the most prominent bony eminence on the shoulder joint. It divides into a large cranial portion and a small caudal one. At 1.5 - 2 cm (about a finger's breadth) above the line which connect these two portions, a needle (18 gauge - 5 cm) was inserted and directed caudomedially for a depth of 4 cm.

**Bicepsal Bursa (Intertuberal Bursa) :**

Two centimeters just below the cranial part of the greater tubercle of the humerus and about 0.5 - 1.0 cm caudally, a similar needle was inserted between M. biceps brachii and the lateral border of the humerus. The needle was then directed caudomedially for a depth of 3 cm.

**Elbow Joint :**

On the lateral aspect of the elbow joint, the lateral tuberosity of the radius can be palpated easily. At 2 cm (about a finger's breadth) above this tuberosity; at 1 cm cranially, the needle can be inserted and directed medially and slightly caudally for a depth of 2.5 - 3 cm.

**Olecranon Bursa :**

This bursa can be injected easily through inserting the needle at a point mid-way on a transverse imaginary line extends from the lateral epicondyle of the humerus to the olecranon process of the ulna. The needle is then directed dorsomedially for an average depth of 4 cm.

**Carpal Joint :**

Such a joint can be injected easily when being flexed. The dorsal surface of the carpus possesses 4 depressions; the proximal pair being the sites for injection into the radiocarpal joint sac. The distal pair being the sites for the middle carpal joint sacs. In any of these depressions, the needle is inserted perpendicularly for a depth of 1.5 cm.

**Fetlock Joint :**

At 2 cm above the lateral tuberosity of the cannon bone between the suspensory ligament and the distal extremity of the cannon, the needle is inserted and directed medially for a depth of 2 cm.

**Pastern Joint :**

Through frequent flexion and extension of the joint, a depression on the dorsal aspect can be felt with the index of the fore-finger. The needle can be inserted in the middle of the depression with slight palmar and distal inclination for an average depth of 1 cm.

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### Coffin Joint :

Just above the coronet on the dorsal aspect of the foot, the needle can be inserted 0.5 cm either laterally or medially to the mid-line. The needle should then be directed palmo-distally for a depth of 2 cm.

### Hip Joint :

On the lateral aspect of the hip joint, the external prominent landmark of the proximal extremity of the femur is the greater trochanter. This is divided into a cranial and caudal portions by a notch (*incisura trochantrica*). Just above the margin of this notch, a long needle (16 gauge - 11 cm) is inserted horizontally with a slight craniomedial inclination for a depth of 7 - 9 cm.

### Stifle Joint :

The site for injecting the femoropatellar joint is in the proximal third of the depression bounded by the lateral and middle patellar ligaments. The needle is directed proximally under the patella for a depth of 4 cm.

In addition to the afore-mentioned sac, there are 2 communicating femorotibial sacs; medial and lateral. Making injection into the lateral sac is best accomplished at the level of the middle third of the depression limited by the lateral and middle patellar ligaments. At the same level in the medial depression between the medial and middle patellar ligaments, an injection can be made into the medial femorotibial joint sac. In case where injection is made in any of these two sacs, the needle is inserted parallel to the long axis of the animal for an average depth of 3.5 cm.

### Hock Joint :

On the dorsomedial aspect of the hock joint; at the level of the distal end of the medial malleolus of the tibia and on either side of the saphenous vein which can be palpated easily, the needle can be inserted for a depth of 2 cm. It is the site for injection into the tibiotarsal sac.

As a general result, in all of the afore-mentioned techniques, placing the needle into the joint cavity or bursal sac is indicated by sudden reduction in resistance to needle penetration. Moreover, synovia may be yielded either spontaneously or can be aspirated with a syringe tightly attached to the needle.

## DISCUSSION

The findings reveal that the familiarity with the surface anatomy of the part concerned for arthrocentesis, intra-articular and/or intra-bursal injection is extremely essential. Close attention should be emphasized to the external landmarks of the intended joint or bursa to assure proper placing of the needle. Generally the techniques procured for accessibility of many joints and bursae in donkeys of the present work agree, with some exceptions, with those reported on the horse by WHEAT (1955), VAN PELT (1962 & 1966), VAN KRUIJNINGEN (1963), ADAMS (1974) and SACK and FERRAGLIO (1978).

The shoulder joint of the dokey can be injected easily through inserting the needle at a point 1 finger's breadth above an imaginary line connects the two portions of the greater tubercle of the humerus on the lateral aspect of the shoulder joint. In such an instance,

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the needle should be directed caudomedially for a depth of 4 cm. VAN KRUININGEN (1963) stated that such a joint in the horse can be injected one and half inches cranial to the prominence of the lateral tuberosity of the humerus forwarding to the caudomedial direction for a depth of 3 inches. The same author injected the biceptal bursa in the horse in a similar manner to our technique in the donkey.

Making injection into or arthrocentesis of the elbow joint can be accomplished easily from the lateral aspect through inserting the needle at 2 cm above and 1 cm cranial to the lateral tuberosity of the radius. WESTHUES and FRITSCH (1960) and VAN KRUININGEN (1963) injected such a joint in the horse also from the lateral aspect at 4 inches below to point of olecranon.

The optimum sites for arthrocentesis or injection of the radiocarpal and middle carpal joint sacs are best achieved and facilitated when the carpus is passively flexed. Owing to the communication between the middle carpal and carpometacarpal articulations, injection into the former sac serves in injection of the latter one. These findings in the donkey agree with those reported on the horse by WHEAT (1955), VAN PELT (1962) and KRUININGEN (1963).

The technique procedured for injection of the fetlock joint of donkeys approximatly resembles that adopted in the corresponding joint in the horse by VAN PELT (1962) and VAN KRUININGEN (1963). The former author injected that joint in the horse by two techniques through the proximal and distal volar pouches.

It is noteworthy to report that the techniques described for arthrocentesis or injection of the pastern joint sac has the periority of establishment in equines especially in the donkey.

The approach to the coffin joint in this study resembles that applied in the horse by VAN KRUININGEN (1963).

As regards hip joint, the external landmarks for arthrocentesis or injection of this in donkeys; the insertion of the needle through the notch, incisura trochantica has been similarly applied in the horse by WESTHUES and FRITSCH (1960) and VAN KRUININGEN (1963).

The external landmarks determined for injection or aspiration of the stifle joint in our work bear great resemblance to those metntioned by IBRAHIM et al. (1981) in donkeys and By VAN KRUININGEN (1963) in horses. In our animals, the intended approach for the femoropatellar sac is best accomplished in the proximal third of the V-shaped depresion bounded by the lateral and middle patellar ligaments; the needle is then directed proximally beneath the patella.

Although communications between the femoropatellar and medial and lateral femorotibial sacs are available in the donkey, any of the latter joint sacs can be injected or aspirated as mentioned in the context of the present text. These findings in the donkey disagree the statement of VAN KRUININGEN (1963) who stated that injection of these sacs in the horse is unreliable and difficult to accompalish.

The technique described for arthrocentesis or injection of the hock joint in the donkey agrees with that applied in the horse by VAN KRUININGEN (1963).

In conclusion, the techniques desribed for making injection or aspiration of joints or bursae in donkeys of the present work would provide useful and practical aids in diagnosis and treatment of lameness in donkeys.

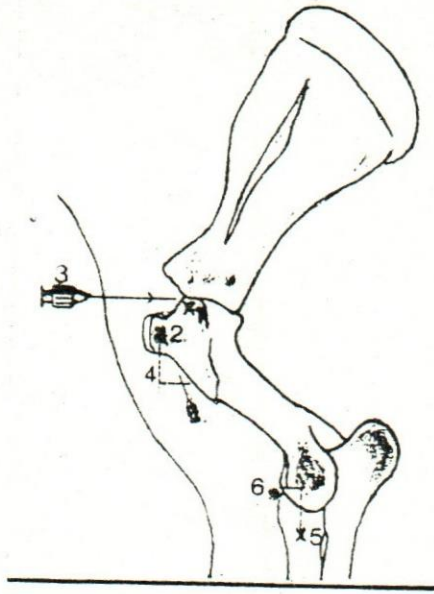
## STUDIES ON INTRA-ARTICULAR AND INTRA-BURSAL INJECTIONS

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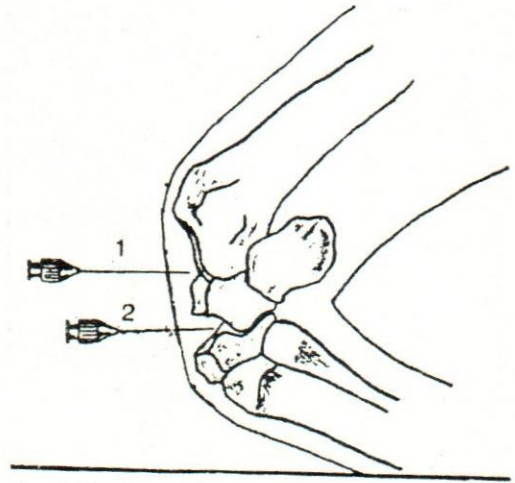
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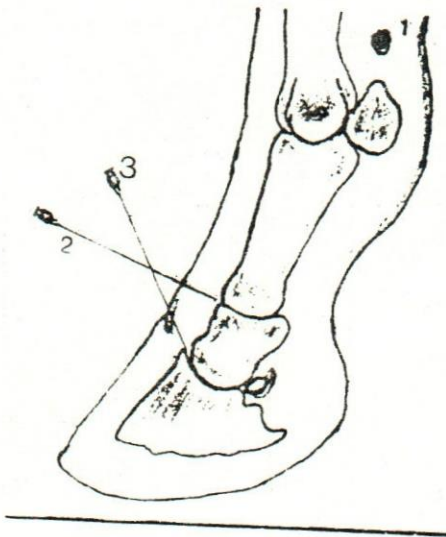
**Fig. (1):**

Left shoulder of donkey, lateral aspect. Palpable bony eminences (X), caudal prominence of the lateral tuberosity of the humerus (1), cranial prominence of the lateral tuberosity joint (3), needle inserted into biceptal bursa (4), lateral tuberosity of the radius (5), and needle inserted into elbow joint (6).



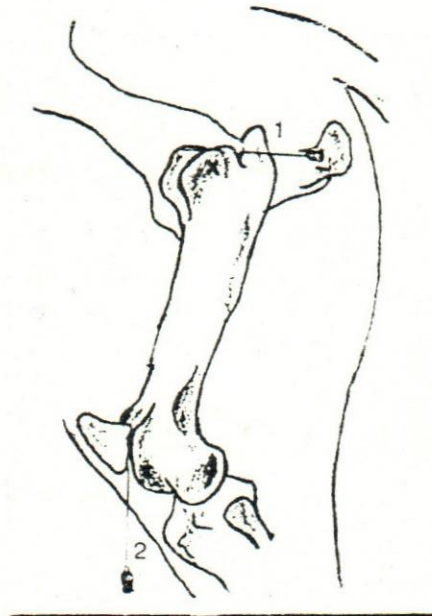
**Fig. (2):**

Flexed left carpus. Needles are inserted into radiocarpal joint sac (1), and intercarpal joint sa (2).



**Fig. (3):**

Left fetlock, lateral aspect. Needles are inserted into the fetlock joint sac (1), pastern (2) and coffin (3).



**Fig. (4):**

Left hip and stifle, lateral aspect. Palpable bony eminence (X). Needles are inserted into hip (1), and femoropatellar joint sac (2).

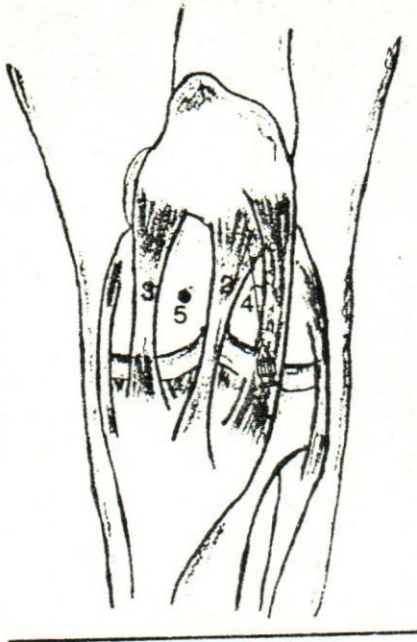


Fig. (5)

Left stifle, cranial aspect. Lateral, middle and medial patellar ligaments (1, 2 & 3 respectively). Needles are inserted into femoropatellar joint sac (4) and medial femorotibial joint sac (5).

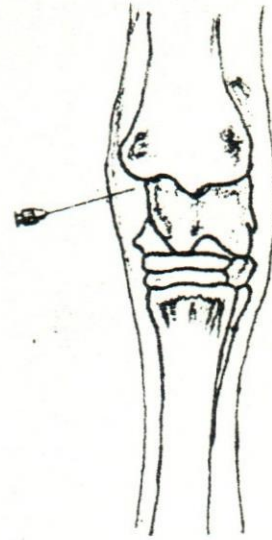


Fig. (6):

Left tarsus, cranial aspect. Needle is inserted into tibiotarsal joint sac.

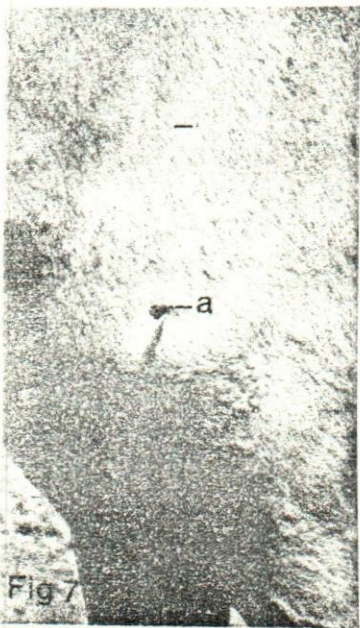


Fig 7



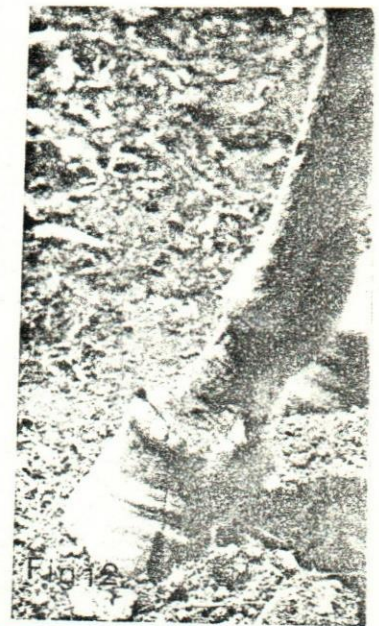
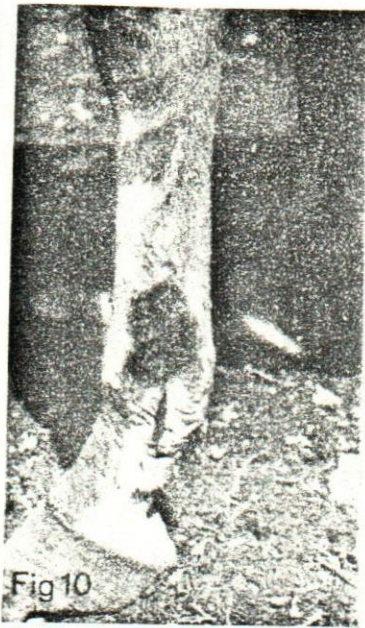
Fig 8



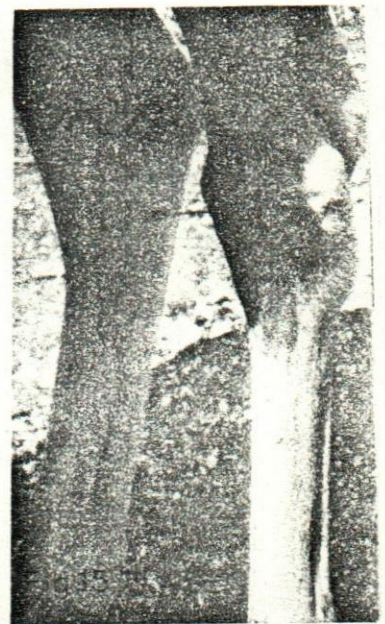
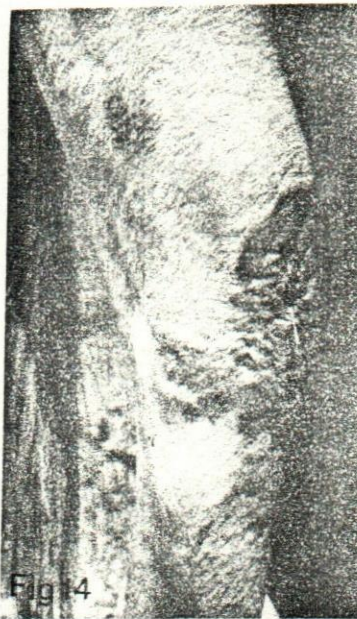
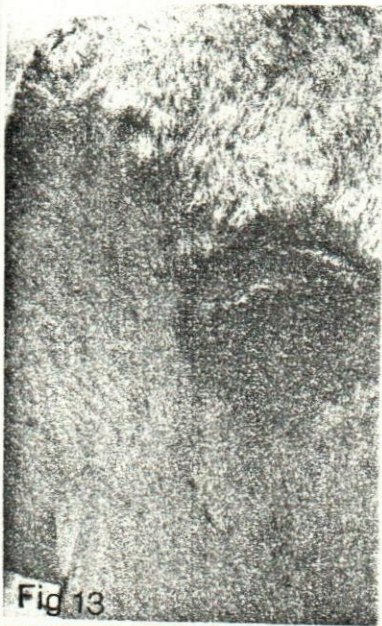
Fig 9

Figs. (7 - 9): Left thoracic limb of donkey. Sites of needle's insertions into shoulder joint (7a), biceptal bursa (7b), elbow joint (8a), olecranon bursa (8/b), radiocarpal joint (9/a), and intercarpal joint (9/b) may be seen.





**Figs (10 - 12):** Left thoracic limb of donkey. Needles are inserted into fetlock (10), pastern (11), and coffin (12) joints.



**Figs. (13 - 15):** Pelvic limb of donkey. Needles are inserted into left hip (13), right stifle (femoropatellar) (14), and left hock (15) joints.

**Figs. (13 - 15):** Pelvic limb of donkey. Needles are inserted into left hip (13), right stifle (femoropatellar) (14), and left hock (15) joints.