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**SOME RADIOGRAPHIC CHANGES FOLLOWING SESAMOIDITIS
AND FRACTURE OF THE PROXIMAL SESAMOIDS
IN DONKEYS**
(With 9 Figs.)

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التغيرات الراديولوجية المصاحبة لإلتهاب وكسور العظام
السمامية العلوية في الحمير

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سجلت تسعة حالات لإلتهابات وكسور العظام السمامية العلوية في الحمير تعددت هذه الإصابات في الرجل اليسرى الأمامية في أربعة حالات وثلاثة في الرجل اليمنى الأمامية وحالة واحدة في الرجلين الأماميتين وحالة واحدة في الأرجل الخلفية . وقد وصفت الأعراض الإكلينيكية والتغيرات الراديولوجية المميزة والمصاحبة في حالات الإلتهاب والأنواع المختلفة لكسور العظام السمامية العلوية .

SUMMARY

Sesamoiditis and fractures of the proximal sesamoid bone were reported in 9 donkeys. These conditions were observed in 4 left forelimbs, 3 right forelimbs, one in both forelimbs and only one case in the left hindlimb. The clinical signs and characteristic radiographic changes accompanying sesamoiditis and some types of proximal sesamoid fractures were described.

INTRODUCTION

The most common surgical affections of the proximal sesamoid bones are inflammation (sesamoiditis) and fractures. These conditions are of special interest to veterinarians, because they need a long time for healing and are frequently unsatisfactory. Sesamoiditis may be seen with fractures of the sesamoid bone, and it has been suggested that it may predispose to fracture (TURNER, 1984).

The etiology of such sesamoid involvement is variable. CHURCHILL (1956) suggested that muscular fatigue and unequal tension applied to the sesamoid bone when the foot strikes the ground in an unbalanced position are the cause of fracture. Fractures of

the sesamoid bones were thought to be caused by stepping on a golf ball as the animal was walking across the track infield (WHEAT and RHODE, 1958 and ADAMS, 1974).

The clinical and radiographic signs associated with fractures of the proximal sesamoid bones in horses vary according to the severity of fracture and to whether one or both bones are involved, and whether there is concurrent suspensory ligament or fetlock joint pathology (PETERS, 1949; MCKIBBIN and ARMSTRONG, 1970; ADAMS, 1974; ELLIS, 1979 and TURNER, 1984).

RAKER (1968) stated that fractures of the proximal sesamoid are treated by surgical removal of that portion of the bone and the prognosis was favorable. The prognosis of fractures of the base of the sesamoid bone, although they can be removed surgically, is guarded to unfavorable. MCKIBBIN and ARMSTRONG (1970) and FACKELMAN and NUNAMAKER (1982) advocate the use of bone screws for treatment of mid portion fracture of one sesamoid bone.

The aim of this work is to describe the clinical and radiological signs accompanied by some affections to the proximal sesamoid bones in donkeys. Radiographic evidence of ossifications resulting from sprain of the intersesamoidean ligament and the branches of the suspensory ligament were reported.

MATERIAL and METHODS

In this report, nine donkeys varying in age and sex were admitted to the surgery clinic, faculty of veterinary medicine, Assiut University suffering from some troubles at the metacarpophalangeal region.

CLINICAL EXAMINATION:

Following the case history, observation of the animal from a distance, the fetlock region was palpated to detect the areas of pain on pressure especially over the sesamoid bones. The joint was flexed and extended to check for crepitations and pain on movement. The suspensory ligament was examined by palpation in standing position and with the limb flexed.

RADIOGRAPHIC EXAMINATION:

Routine radiographic examination of the fetlock joint and proximal sesamoid bones were applied in 4 views, anteroposterior, lateral, oblique (dorsoplmar, 35°) and a flexed lateral views. With the mobile X-ray unit the pictures were taken using 60 KV. and 8 MAS. The leg of the animal was held up, with the assistant holding the cassette in close to the fetlock joint.

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RESULTS

CASE NO. 1:

A 3-years old she donkey was presented because of severe lameness of the right forelimb for 3 weeks. The case history indicated that the animal was exposed to direct trauma during the work. The animal bear the weight on the toe. Swelling of the fetlock joint and pressure especially on the proximal sesamoid bones revealed severe pain. There was crepitation sound on movement of the joint and a depression was felt between the pieces of fractured sesamoid bone. The palpation of the suspensory ligament revealed severe pain. Radiographic examination in oblique view showed bilateral fracture of the sesamoid bones. The medial sesamoid bone revealed mid fracture and fibrous union. The lateral sesamoid bone showed comminuted fracture (Fig. 1). The prognosis was claimed to be unfavorable and animal was destroyed.

CASE No. 2:

A 7-years old male donkey was admitted for students surgical training. There was large hard swelling at the metacarpophalangeal region of the right forelimb. Manipulation of the swelling revealed slight pain on pressure and no crepitations were felt. The distal third of the large metacarpal bone revealed bony exostosis on manipulation. Trial for extension and flexion of the fetlock joint were impossible and produced severe pain. Radiological findings from anteroposterior and lateral views cleared the presence of an old comminuted fracture of the lateral proximal sesamoid bone. Chronic sesamoiditis accompanied by ossification of the suspensory and distal sesamoidean ligaments were noticed. The joint capsule of the fetlock joint was ossified. There were subchondral bony sclerosis of the first phalanx and calcification of the common digital extensor tendons was also observed (Fig. 2 a & b).

CASE No. 3:

A 2-years old male donkey was referred because of both forelimbs lameness. The lameness was more clear in left forelimb than in right one. The duration of lameness was about 6 months in right forelimb then it appeared in left forelimb. Manipulation of the metacarpophalangeal region of both forelimbs revealed hard painfull swelling. The movement of the fetlock joint in both limbs caused severe pain. Radiological examination of right forelimb, AP view revealed fragmentation and lysis of the lateral proximal sesamoid bone, chronic sesamoiditis and ossification of the suspensory ligament were noticed. The left forelimb showed old bilateral fracture of the proxiaml sesamoid bones, mid fracture of the lateral proximal sesamoid bone and apical fracture of the medial sesamoid bone (Fig. 3 a & b). The animal was destroyed because of very bad prognosis.

CASE No. 4:

A one year old male donkey was presented because of left forelimb lameness. There was a slight swelling at the fetlock region which revealed pain on pressure

and on passive movements of the fetlock joint. Radiographic examination of AP view showed an a radiolucent area on the proximal third of the lateral proximal sesamoid bone. The apex of the bone was elongated and there was an area of ossification of the lateral branch of the suspensory ligament (Fig. 4).

CASE No. 5:

A 6-years old male donkey was referred because of slight lameness of the left hindlimb. There was a slight swelling of the fetlock region. No. crepitations could be felt but the passive movement revealed pain. Pressure on the branches of the suspensory ligament revealed pain. Radiographic appearance in lateral dorsiflexion of the fetlock joint revealed apical chip fracture of the lateral proximal sesamoid bone (Fig. 5).

CASE No. 6:

A 3-years old male donkey was presented because of moderate degree of lameness of the left forelimb. There was slight swelling of the fetlock joint. Pressure on the proximal sesamoid bones especially on palmar aspect caused pain. Radiological finding revealed chronic sesamoiditis and new boney formations were present on the palmar aspect (Fig. 6).

CASE No. 7:

A 5-years old male donkey was admitted because of severe lameness of the right forelimb due to an accident. Clinical finding of acute inflammation were observed. Crepitation was felt on pressure of the fetlock. Radiological examination revealed in AP view that there was mid fracture of the medial proximal sesamoid bone. Chip fracture of the distal end of the large metacarpal bone and proximal end of the first phalanx were also observed (Fig. 7).

CASE No. 8:

A 3-years old male donkey was presented because of left forelimb lameness. There was a swelling which appear more larger on the lateral aspect of the fetlock than on the medial aspect. Pressure on the palmar aspect of the large metacarpal bone and the fetlock joint caused snatching of the animal's limb. Movement of the fetlock joint revealed pain and crepitation were felt. Radiological findings of AP view showed irregular basal fracture of the lateral proximal sesamoid bone accompanied with chip fracture of the first phalanx (Fig. 8).

CASE No. 9:

A 2-years old male donkey was referred because of severe lameness of the left forelimb with injury of the fetlock joint. The animal was bearing the weight on the toe. Bloody synovia appeared during extension and flexion of the fetlock joint. Crepitation sound was felt during presure on the fetlock region. Radiographic appearance on

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oblique view showed comminuted fracture of the lateral proximal sesamoid bone with displacement of bone fragment. The case was diagnosed as complicated, comminuted fracture of the lateral proximal sesamoid bone (Fig. 9).

DISCUSSION

The proximal sesamoids are two small bones pyramidal in shape situated in the palmar aspect of the distal end of large metacarpal bone in the forelimbs and at the planter aspect of the distal end of large metatarsal bone in the hindlimbs (SISSON, 1975). They are set firmly in a huge number of ligaments forming stay apparatus in equines. These ligaments are proximal, distal and intersesamoidean ligaments. This anatomical position exposes the proximal sesamoid bone to certain conditions such as sesamoiditis and fractures. The pull of the suspensory ligaments and distal sesamoidean ligaments on the two sesamoid bones at that instant is very great and this time when the fracture is most liable to occur (PETERS, 1949). The position of the digital blood vessels (arteries and veins) along the abaxial aspects of the proximal sesamoid bone also makes the vessels unprotected against trauma or stretching. Any unusual strain to the fetlock area may produce sesamoiditis (ADAMS, 1974). The causes of these reported sesamoid bone affections in donkeys are mainly traumatic injury and sprain of the sesamoidean ligaments. The injury may involve fractures of the medial and lateral proximal sesamoid bone, avulsion of distal sesamoidean ligaments, or tearing the body or inserting branches of the suspensory ligament proximal to the sesamoid bones (MCKIBBIN and ARMSTRONG, 1970; ADAMS, 1974 and RICHARDSON, *et al.* 1987).

The proximal sesamoid bone involvement in donkeys was observed in the left forelimb (4 cases), in the right forelimb (3 cases), in both forelimbs (one case) and in hindlimb (one case). The lateral proximal sesamoid bone was the most frequently exposed in donkeys. Most fractured sesamoids occur in the frontlimb in the thoroughbred and quarter horse, but in standard bred they are most common in the hindlimb (SEVELIUS and TUFVESSON, 1963; RAKER, 1968 and ADAMS, 1974).

The clinical signs associated with chronic sesamoiditis in donkeys were slight to moderate degree of lameness, slight and hard swelling on the palmar aspect of the proximal sesamoid bone and passive movement of the fetlock joint revealed pain. If inflammation become more chronic, marked proliferation of tissue may occur with exostoses and limitation in the movement of the joint (FRANK, 1959). Severe pain to deep palpation of the affected bone was observed. There may be heat, pain and swelling of the suspensory ligament at its insertion as both structures are part of the suspensory apparatus (HAYNES, 1980).

The clinical signs of chronic sesamoiditis may be more progressive in some cases of fracture of the proximal sesamoid bone. There was a large hard swelling at the fetlock region, manipulation of the swelling revealed slight pain, no crepitation was

felt and the trial for passive movement of the fetlock joint was impossible and produced severe pain (case No. 2).

The signs of complete fracture of the proximal sesamoid bone are easily recognized. The horse will stand with the injured leg extended forward, resting the foot on the toe with fetlock flexed. There will be considerable inflammation and some swelling of the area of the sesamoid. There is no depression indicating separation of the two pieces of the bone and no crepitation (PETERS, 1949). These aforementioned signs were observed in some cases of sesamoid fracture in donkeys (case No. 3, fig. 3 a & b). In some cases before swelling occurs, crepitation and separation of the fractured pieces of bone can be felt as in case No. 1, 7 & 8. Depressions which were felt between the pieces of fractured bone indicated that the cartilagenous pad which covers and fills the interval between the opposite borders of the two bones, is also torn, thus allowing the pieces of bone to separate (PETERS, 1949 and WHEAT and RHODE, 1958).

In complicated fracture of the sesamoid bones, the symptoms were the same as in simple fracture except there was severe inflammation with considerable swelling and more pain. Bloody synovia was appeared during passive movement of the fetlock as reported in case No. (9).

The proximal sesamoid bones can be the site of significant radiological lesions which may require careful radiographic technique for their demonstration. Although they are situated completely behind the large metacarpal or metatarsal bones, they can be demonstrated in the antero-posterior plane, provided that the exposure factors are adjusted to permit adequate and in some circumstances oblique projections may be necessary (DOUGLAS and WILLIAMSON, 1970). Lateral dorsoflexion exposure was also helpful to demonstrate the apical fracture of the proximal sesamoid bone (Fig. 5).

The main radiological changes accompanied by chronic sesamoiditis which recorded in donkeys were: A radiolucent area (lysis) of the proximal third of the lateral proximal sesamoid bone (Fig. 4), proliferative deformity and demineralization (osteoprosis) of the bone (Fig. 6), calcification and ossification of the branches of the suspensory ligament (Fig. 2 a & b & 3 a) and mineralization and ossification of the distal sesamoidean ligament (Fig. 2 b). Evidence of periosteal damage as a result of pulling of tendinous insertions may be recognised by avulsion of small bone fragment (Fig. 5) or other evidence of periostitis and of new bone formation (Fig. 2 a & b and 4).

From the available literature in this object it was found that the common radiological terms of fracture of the proximal sesamoid bone mainly depends on the location of fracture, such as apical (chip) fracture (ADAMS, 1974; HAYNES, 1980 and TURNER, 1984). This type of fracture was recorded in case No. 5 & 8. When the sesamoid bone was involved in the middle part, it is termed mid fracture (DEITZ and NAGEL, 1960;

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MCKIBBIN and ARMSTROMG, 1970 and FACKELMAN and NUNAMAKER, 1982) which registered in case No. 1. The fracture which is located in the distal third of the proximal sesamoid bone (Fig. 3 b & 7) is termed basal fracture (PETERS, 1949; WHEAT and RHODE, 1958 and ADAMS, 1974). According to the number of bone fragments, some cases of multiple or comminuted fracture were recorded in case No. 1, 2 & 3. Fracture of the proximal sesamoid bone may be unilateral (Fig. 2 a, 3 a, 7 & 8) or bilateral (Fig. 1 & 3 b).

The radiological descriptions of the proximal sesamoid bone involvement are of great help in choice of ideal method of treatment.

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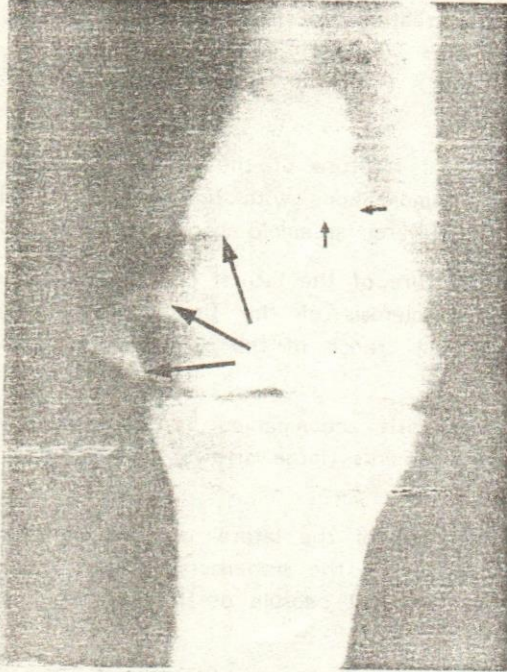
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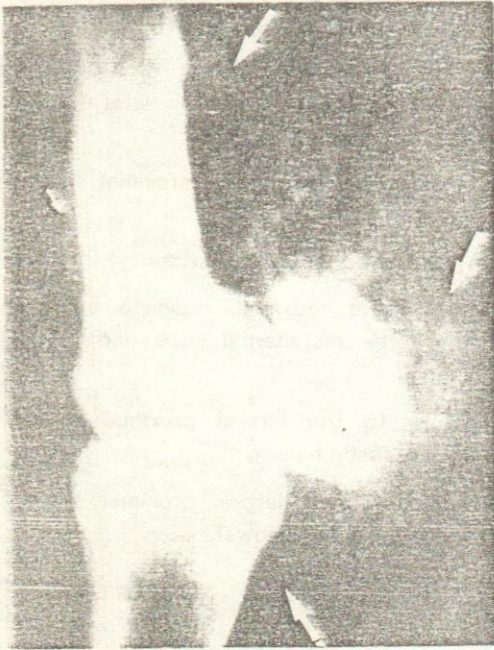
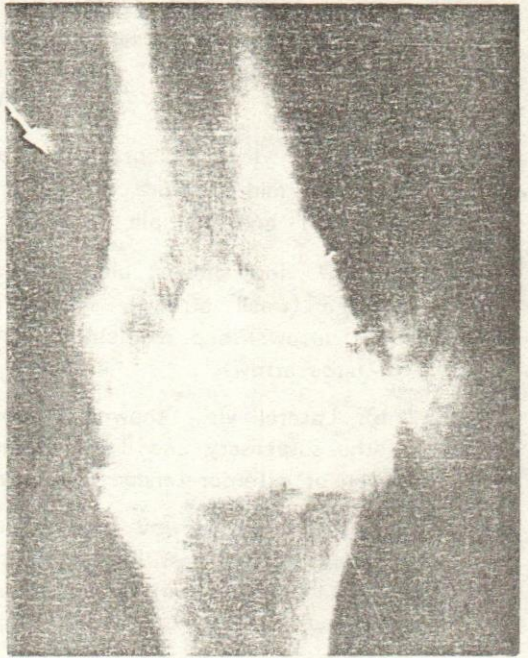
LEGENDS

- Fig. (1): Oblique view radiograph showed bilateral fracture of the proximal sesamoid bones, mid fracture of the medial sesamoid bone with fibrous union (small arrow) and multiple fracture of the lateral sesamoid bone (large arrow).
- Fig. (2, a): AP view showed old comminuted fracture of the lateral proximal sesamoid bone (small arrows), subcondral bone sclerosis of the first phalanx (head of arrows) and ossification of the medial branch of the suspensory ligament (large arrow).
- Fig. (2 b): Lateral view showed chronic sesamoiditis accompanied by ossification of the suspensory and distal sesamoidean ligaments (large arrows) and calcification of extensor tendons (small arrow).
- Fig. (3 a): AP view showed fragmentation and lysis of the lateral proximal sesamoid bone (arrow), ossification of the branches of the suspensory ligament (black and white arrows) and ossification of the joint capsule of the fetlock (small arrow).
- Fig. (3 b): AP view showed mid fracture of the lateral proximal sesamoid bone (white arrow) and apical fracture of medial sesamoid bone (black arrow).
- Fig. (4): AP view showed a radiolucent area on the proximal third of the lateral proximal sesamoid bone (small arrow) and ossification of the lateral branch of the suspensory ligament (large arrow).
- Fig. (5): Dorsiflexion view showed apical chip fracture of the lateral proximal sesamoid bone.
- Fig. (6): Lateral view showed chronic sesamoiditis and new bony formations.
- Fig. (7): AP view showed mid fracture of the medial proximal sesamoid bone and chip fracture of the distal end of the large metacarpal bone and proximal end of the first phalanx.
- Fig. (8): AP view showed irregular basal fracture of the lateral proximal sesamoid bone accompanied with chip fracture of the first phalanx.
- Fig. (9): Oblique view showed comminuted fracture of the lateral proximal sesamoid bone with displacement of the bone fragment (small arrows).

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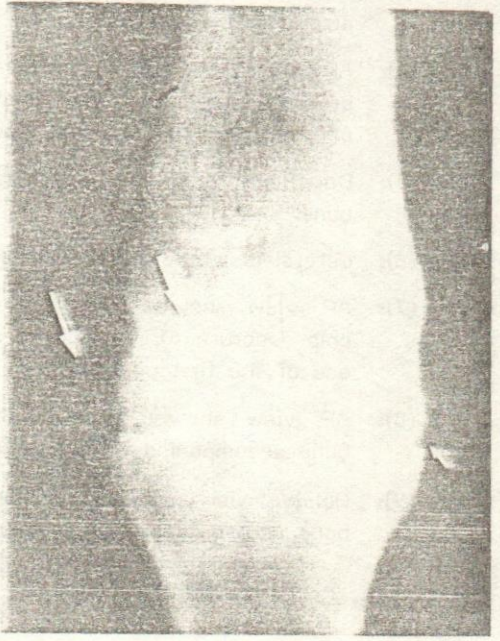
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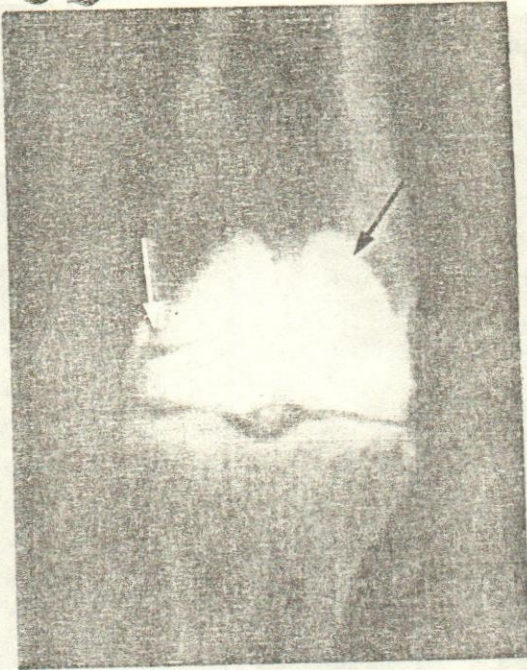
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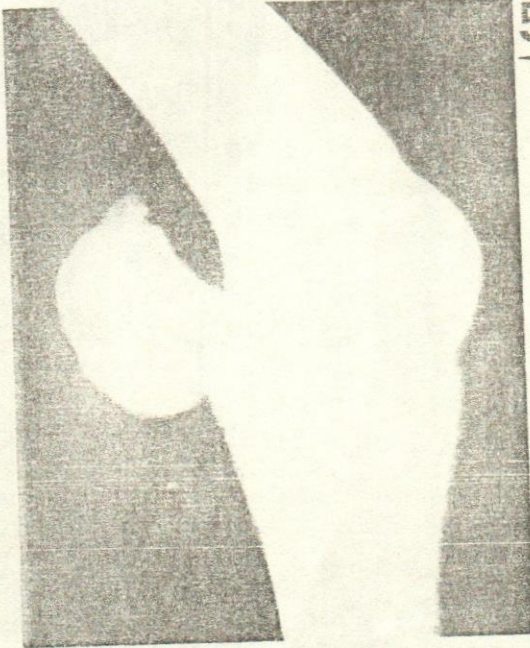
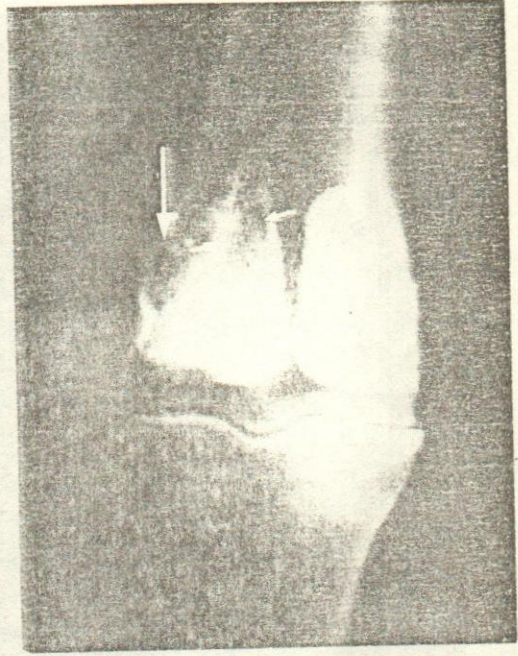
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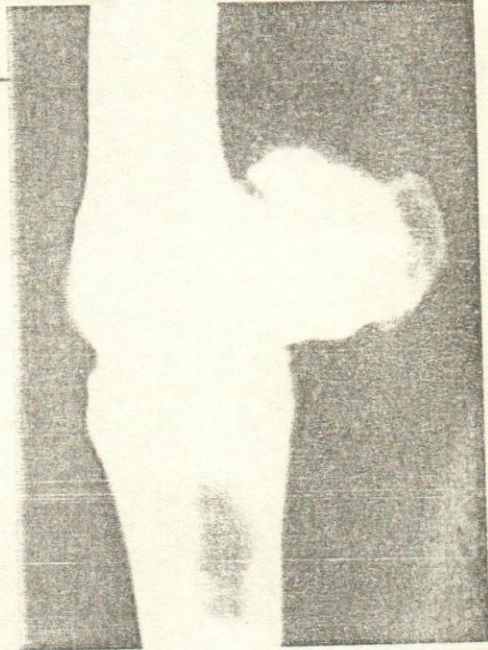
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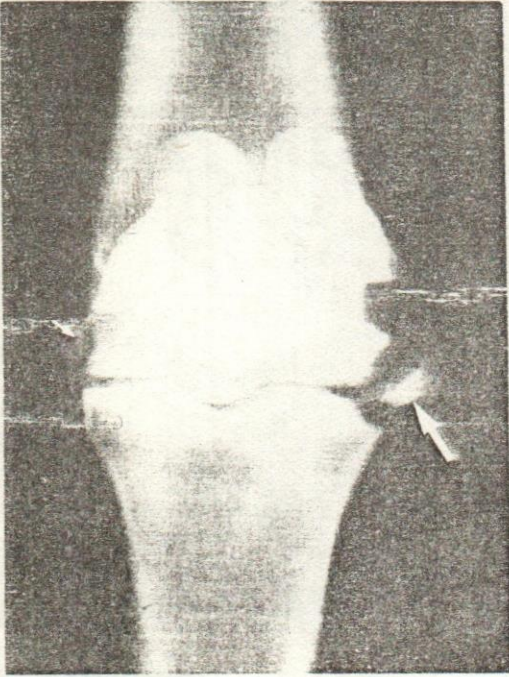


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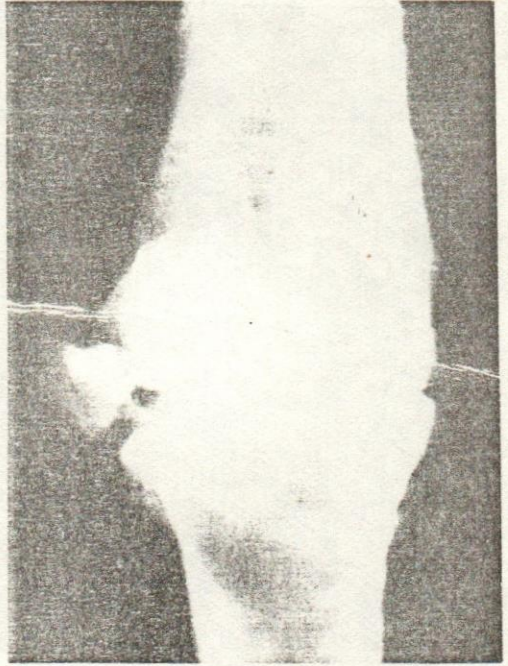


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