Acta orthop. Scandinav. *40*, 122–129, 1969

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AGE AND SEX INCIDENCE OF ANKLE FRACTURES

By

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Received.1.ix.67

Bruns (1882) was the first to demonstrate the influence of age on the production of fractures. More recent studies indicate (*Buhr & Cooke* 1959, *Alffram & Bauer* 1962, *Alffram* 1964) that while certain injuries, at least in adults, are caused mainly by trauma, other injuries to the skeleton such as fracture of the forearm and of the upper end of the femur are apparently related to the endogenous factors of age and disease. These studies have formed a basis for further research with the prevention of fractures as an ultimate goal.

In fractures of the ankle joint the mechanics of the causative trauma have been studied. The information obtained from such studies has greatly improved the treatment of these injuries. The objective of the present study, however, was to describe the age and sex incidence of fractures of the ankle joint, particularly with reference to fracture patterns indicating endogenous causes of fracture.

MATERIAL AND METHODS

The data in this study were obtained from a clinical follow-up of 717 fractures of the ankle joint diagnosed in the Department of Radiology at the General Hospital, Malmö. All the individuals over fifteen years of age and residents of Malmö were included. As practically all the roentgendiagnostic work on traumatic cases in Malmö is carried out in this hospital the figures arrived at are very close to the absolute numbers of diagnosed fractures in the city. Age and sex specific incidence was then calculated on the basis of the population of Malmö (Figure 1).

The study covered largely the time period during which the data of *Alffram & Bauer* (1962) and *Alffram* (1964) were obtained from the very same population (Figures 2 and 3).

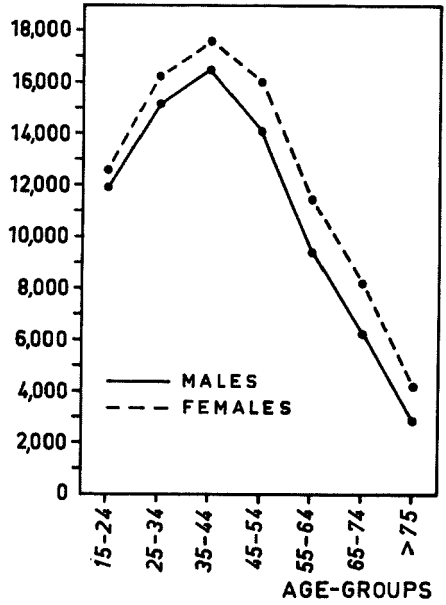

Figure 1. Age and sex distribution of the population of Malmö.

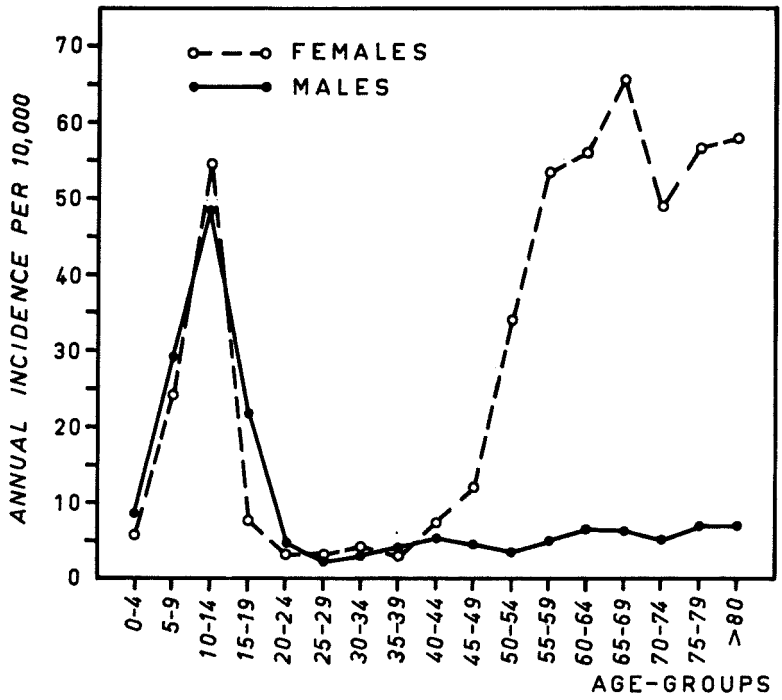

Figure 2. Age and sex incidence of fractures of the distal end of radius and/or ulna (Alffram & Bauer 1962).

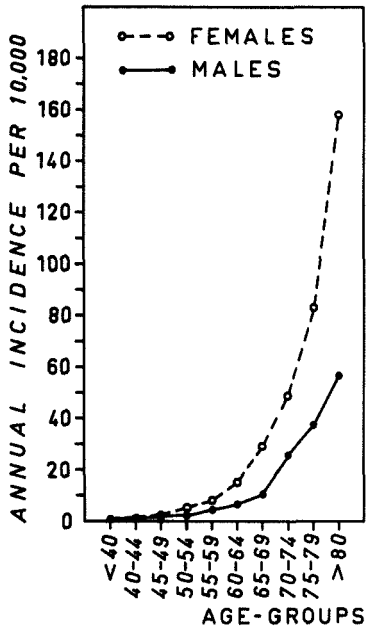

Figure 3. Age and sex incidence of fractures of the upper end of femur (Allfram 1964).

RESULTS

Graphical representations of the age and sex specific incidence of various fractures and combinations of fractures are presented in Figures 4 to 9. A constant finding in females was a definite increase starting about the age of fifty. Also fairly constant was a decrease in incidence with age in both sexes, generally starting earlier in males. Ankle joint fractures were more common in males except for the more extensive injuries, fractures involving the posterior process of the tibia and the trimalleolar fractures which were more common in females.

DISCUSSION

The definite increase in incidence observed in females about the age of fifty corresponds well to the increase observed in fractures of the forearm (Figure 2). This increase of incidence may be explained by a changed quality of the bone according to the observations of *Bauer* (1960) and *Alffram & Bauer* (1962). There is no equivalent to the increasing incidence observed in fractures of the proximal end of the femur (*Alffram* 1964) (Figure 3) nor to the maintained high incidence

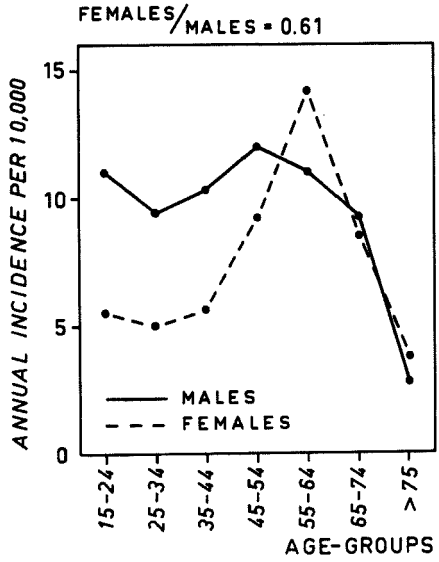

Figure 4. Age and sex incidence of fractures of the ankle joint (total material 717 fractures).

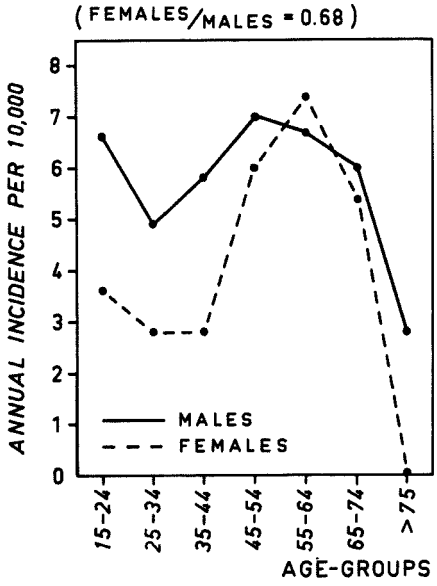

Figure 5. Age and sex incidence of fractures of the lateral malleolus only (414 fractures).

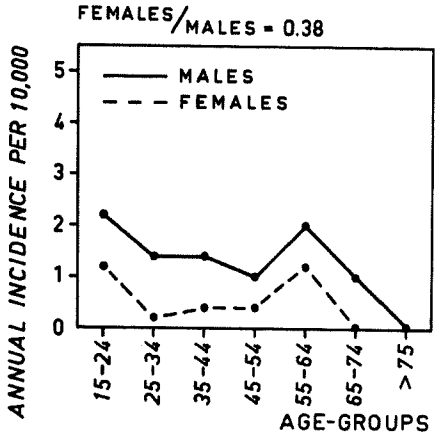

Figure 6. Age and sex incidence of fractures of the medial malleolus only (73 fractures).

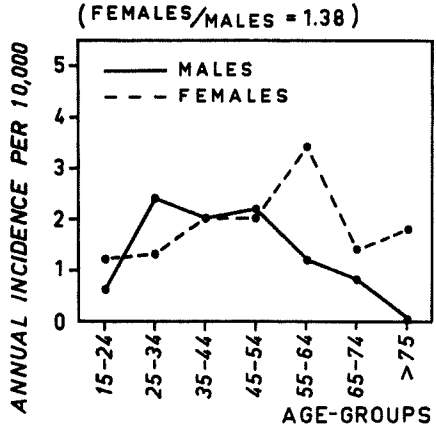

Figure 7. Age and sex incidence of fractures of the posterior tibial process, isolated or combined with other fractures of the ankle joint (143 fractures).

of fracture of the forearm. There are two possible explanations of this phenomenon; the risk of adequate trauma may be less in older age because of the generally changed behaviour of the elderly and common causes of fracture such as stumbling while running downstairs, bicycle accidents and sports injuries, all accidents that may provide the adequate type and degree of trauma, are less common in the elderly. In addition, changes of the strength of the ligaments may influence the fracture pattern. The Venn-diagram in Figure 10 attempts to demon-

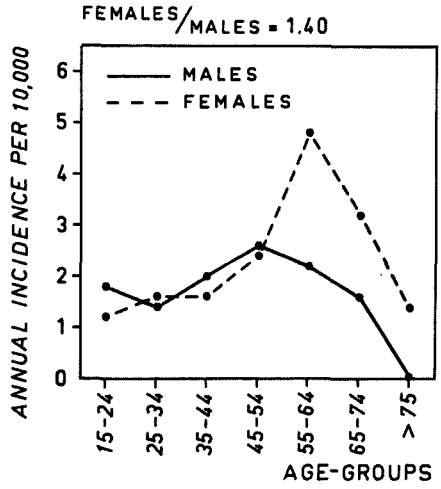

Figure 8. Age and sex incidence of bi- and trimalleolar fractures of the ankle joint (170 fractures).

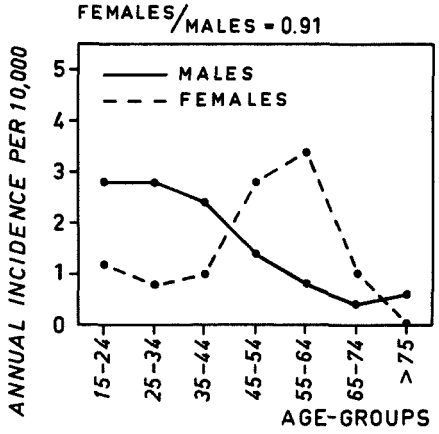

Figure 9. Age and sex incidence of ligamental rupture in the bone attachment only (143 fractures).

strate the interaction of adequate trauma, weakness of the bones and strength of the ligaments in the production of fracture of the ankle joint. A and C is a common combination in young males, A, B, and possibly C together cause the raise of incidence in middle aged females, while the elderly usually retain only the variable B which is usually not sufficient by itself to cause fracture. Figure 9 shows the incidence

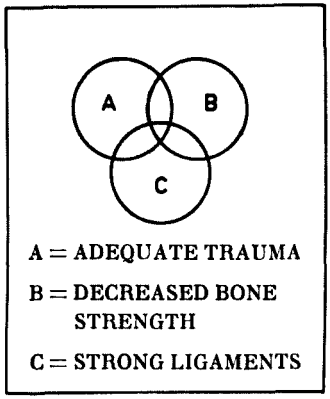

Figure 10. Venn-diagram of possible factors influencing the production of fractures of the ankle joint.

of ligamental rupture in the bone attachment. The peak value in the middle aged women remains largely unchanged, while the incidence of this injury appears to drop in males earlier than observed in other fracture types. This may indicate a decreasing strength of the ligaments and a decreasing influence of factor C.

SUMMARY AND CONCLUSIONS

The age and sex specific incidences of fractures of the ankle joint suggest a strong influence of changes of the bone quality with age, particularly in females. In older ages groups these injuries are rare probably because of decreased risk of adequate trauma and because of changes in the quality of the ligaments.

RESUME

L'incidence de l'âge et du sexe sur l'articulation de la cheville semble indiquer que l'âge a une forte influence sur les modifications de la qualité des os, en particulier chez les femmes. Dans le groupe très âgé, ce genre de lésions sont rares probablement par suite d'un moins grand risque des traumas qui les provoquent et aussi par suite des changements dans la qualité des ligaments.

ZUSAMMENFASSUNG

Das Auftreten von Knöchelbrüchen spezifisch für Alter und Geschlecht legt den Gedanken eines starken Einflusses von Veräderungen der

Knocheneigenschaften mit dem Alter, besonders bei Frauen, nahe. In vorgeschritteneren Altersgruppen sind diese Schäden, wahrscheinlich wegen des geringeren Risiko für ein adequates Trauma und wegen Veränderungen der Eigenschaften der Ligamente, selten.

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