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Instability of the knee. A diagnostic study

Gerding, Johannes Constantijn

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CHAPTER VIII

SUMMARY AND CONCLUSIONS

VIII.1. Summary

The purpose of this thesis is to improve our insight into the diagnosis of chronic posttraumatic instability of the knee. The mechanics of the knee-joint are essential in this respect. Insight into the functioning of the knee-joint improves our understanding of functional disorders of the knee. The diagnosis of chronic instability of the knee ligaments remains difficult. In most cases an accurate diagnosis can only be made on the basis of a combination of several methods of investigation.

Chapter I presents a survey of the pertinent literature and a definition of the objectives of this thesis.

Chapter II gives a brief description of the anatomy of the knee-joint with capsule, ligaments and musculature.

Chapter III discusses some principles of the kinematics and dynamics of the knee-joint. The flexion-extension movement as projected in the sagittal plane has been discussed in many studies. A number of authors have studied the rotatory component of this movement or, rather, the projection of this movement in the transverse plane. We studied the flexion-extension movement as projected in the frontal plane.

A study of two knees under physiological stress reveals a rotatory movement with a total angle of 3.5° and 5° . The voluntary (adjunct) rotation of the knee-joint in anatomical specimens is analysed. In all knees the rotation axis proves to change its position, indicating a combination of rotatory and translatory movements. The evolute obtained differs per specimen in localization and shape, but is usually localized around or medial to the tibial intercondylar eminence. This evolute changes its shape as flexion changes, when ligaments are severed, and when valgus or varus stress is induced.

Chapter IV discusses the anamnesis and examination of the stressed and unstressed knee for instability of the knee-joint. It also presents the clinical data on 60 patients with posttraumatic instability of one or both knees.

Chapter V discusses radiological examinations with and without contrast medium. Avulsion fracture, the Pellegrini-Stieda shadow, hook formation and excessive ossification receive special attention. In the group of patients studied, a relation is established between excessive ossification at the level of the anterior tibial intercondylar area and an an-

terior cruciate ligament lesion, and between osteophyte formation on the tibial intercondylar eminence and chondropathy of the tibiofemoral joint. Arthrography of the cruciate ligaments in the presence of an anterior and a posterior drawer sign is discussed. Important features are the continuity of the cruciate ligaments and the shift of the tibial plateau in relation to the femoral condyles. This chapter also discusses roentgenography under stress, with reference to the literature and to personal observations with the aid of a simple constant-traction stress apparatus.

Chapter VI discusses the arthroscopic features of chronic instability of the knee. Arthroscopy provides information on the menisci, cartilage and both cruciate ligaments. The data obtained by 231 arthroscopies are discussed: 68 unstable knees were diagnosed, with anterior cruciate ligament lesions in 41. A comparison is made of the indices of meniscal lesions and chondropathy in the group with and that without ligament instability. No difference in the number of meniscal lesions is found, but the number of previous meniscectomies differs in the two groups. Chondropathy of the tibiofemoral joint is more frequently observed in the group with ligament instability; a high incidence of chondropathy of the patellofemoral joint is found only in the presence of collateral ligament instability.

Chapter VII presents considerations on the study and its findings. An accurate diagnosis of instability of the knee can usually be established with the aid of several combined diagnostic techniques. This is illustrated by two examples.

VIII.2. Conclusions

An attempt can now be made to answer the questions posed in Chapter I:

1. What is the value of adequate clinical examination in the diagnosis of instability of the knee?

There is a close but not an absolute correlation between drawer sign and cruciate ligament lesion. Differentiation between anterior and posterior drawer sign is usually possible by comparing the two knees. Collateral instability, too, should be determined with the knee in flexion. Differentiation between medial and lateral instability is difficult, and it is virtually impossible to differentiate between instability due to increased space (meniscectomy, absence of cartilage, fracture of the tibial plateau) and ligament instability. Clinical quantification of an instability is usually impossible.

2. What is the value of routine radiological examination in the diagnosis of ligament instability?

Roentgenograms without contrast medium usually fail to reveal the lesions. However, we found an avulsion fracture of the posterior or anterior