

CURRENT TREATMENT MODALITIES OF OSTEOCHONDRITIS DISSECANS OF THE KNEE JOINT : RESULTS OF A NATION-WIDE GERMAN SURVEY

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In a nation-wide survey 350 knee surgeons were asked for their current diagnostic and treatment modalities in patients with osteochondritis dissecans (OD) of the knee joint : 255 questionnaires were analyzed. With respect to the different imaging techniques, standard xray studies were performed by all surgeons. Other techniques were used in the following decreasing order of preference : xray tomography, MRI, CT-scan, ultrasound, bone scan, and arthrography. The indication for surgery was primarily influenced by the standard xray, and secondarily by xray tomography, then by MRI, and CT-scan. Regarding cartilage-inducing treatment methods, Pridie drilling (antegrade) was by far predominant over abrasion arthroplasties and Beck drilling (retrograde). Cartilage or perichondrium transplantation was performed rarely. For fixation of a loose fragment most of the surgeons preferred "Ethipins" followed by screws and K wires.

Only one-third of the surgeons used MRI as one of the first diagnostic tools, but a higher percentage of surgeons recommended MRI in special cases. Especially in young patients MRI was used as often as plain xray, whereas the use of MRI in older patients was remarkably reduced.

Concerning treatment modalities, the majority of surgeons treated young patients with protection from weight bearing. For cartilage stabilization, "Ethipins" were preferred, whereas screws were rarely recommended. Approximately 25% of the physicians would not treat asymptomatic patients at all. Even patients with typical symptoms were not treated by less than 15% of the surgeons. In general, adults with OD still embedded in the cartilage bed are treated more aggressively. In cases with a loose body the cartilage-inducing procedures are preferred. Perichondrium or cartilage transplantations are only rarely performed.

Keywords : osteochondritis dissecans ; knee-joint ; diagnosis ; treatment modalities.

Mot-clés : ostéochondrite disséquante ; genou ; diagnostic ; modalités de traitement.

INTRODUCTION

Osteochondritis dissecans (OD) is a localized osteochondral disease with or without necrosis of the subchondral bone. The femoral condyles are the most frequent location. The typical lesion is in the medial condyle, while lesions in the lateral condyle and the patella usually have a traumatic origin (7). As a possible cause some authors favor either a single trauma or recurrent microtrauma (20, 26, 34), or local disturbance of the subchondral bone nutrition. Furthermore, a genetic predisposition is discussed (25, 27, 32), and there are different, somewhat controversial opinions, regarding disturbances of the ossification as an etiologic factor (3, 21, 29).

Probably the genesis of OD is an interaction of several factors manifested by local insufficiency of the blood supply. The true etiology, however, remains unknown.

Clinical symptoms are often absent before sequestration has taken place. There might be non-

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specific knee pain which may increase during activity, with occasional swelling, effusion, and some atrophy of the quadriceps muscle (13, 30). In case of a detachment of the fragment, sudden painful impairment of motion, blocking, locking, snapping or crepitation can occur; this can disappear for intervals and can mimic the clinical signs of a torn meniscus.

The diagnosis has to be made by xray, CT-scan, or MRI. For the early stages MRI shows the highest diagnostic relevance (15, 16, 18, 22). Whereas plain xrays (especially tunnel views) can confirm the diagnosis in most of the cases, bone scan allows assessment of the progress of healing (4, 9).

According to the recommendation of Arcq (1) OD is divided into 3 stages (beginning, demarcation, detachment). Other more differentiated gradings were suggested but they have not been well accepted. Because of the distinctive arthroscopic diagnosis and the detection of early stages by MRI, Imhoff *et al.* (14) established their own staging with regard to the classification of Arcq (1), Bauer and Jackson (2), Rodegerdts and Gleissner (28) and Diapaola *et al.* (8).

MATERIAL AND METHODS

A standardized questionnaire was sent to 350 colleagues. They were recruited from the group of AGA-instructors (Arbeitsgemeinschaft für Arthroskopie) as well as general surgeons, trauma surgeons and orthopedic surgeons well known for their experience in knee surgery.

The questionnaire contained 4 parts. In the first part general questions were asked regarding the department size, bed capacity and yearly arthroscopic operations. The second part contained questions concerning the use of imaging modalities to confirm the clinical suspicion of OD, and we asked which imaging technique was most decisive for the indication for surgery.

In the third part the surgeons answered questions concerning therapeutic procedures they usually performed. Furthermore we wanted to know to what extent weight bearing and sports activities were prohibited after the different procedures.

In the fourth part four typical hypothetical cases were given (no xrays were included) and the surgeons were asked for their preferred diagnostic methods as

well as their treatment modalities. The hypothetical cases were as follows:

Case 1: A 12-year-old girl with pain during activities. The clinical symptoms indicate osteochondritis dissecans. The xray shows an osteochondritis dissecans of the medial femoral condyle with a demarcation zone.

Case 2: A 12-year-old girl suffering from knee pain during activities. The clinical examination shows retro-patellar symptoms. On xray osteochondritis dissecans of the medial condyle with a demarcation zone is present.

Case 3: A 24-year-old man suffering from pain during activities. The clinical symptoms indicate osteochondritis dissecans. Xrays show osteochondritis dissecans of the medial condyle with a demarcation zone.

Case 4: A 24-year-old patient with an (old) loose body after osteochondritis dissecans of the medial condyle.

Two hundred eighty-seven questionnaires were returned: 32 could not be analyzed. Of the 255 questionnaires evaluated, 55 were provided by orthopedic departments, 77 by trauma departments and 123 by general surgery departments. The average yearly number of knee operations was 312.

RESULTS

Diagnosis: Plain xray was performed by all surgeons. Other techniques were used in the following decreasing preference: xray tomography, MRI, CT-scan, ultrasound, bone scan, and arthrography (fig. 1).

In order to evaluate the diagnostic procedures with the greatest influence on the indication for surgery, each diagnostic test was assessed according to its importance on a scale from 1 to 8. It turned out that the plain xray image influenced the surgeons' decision most. It was followed by xray tomography, MRI, and CT-scan. Scintigraphy, ultrasound and arthrography were of no substantial importance (fig. 2).

Therapy: Among the cartilage-inducing surgical procedures, Pridie drilling was most frequently performed. Next were abrasion arthroplasties and Beck drilling. Cartilage and perichondrium transplantations were rarely performed. For the fixation most of the surgeons used Ethipins rather than screws and K-wires (fig. 3).

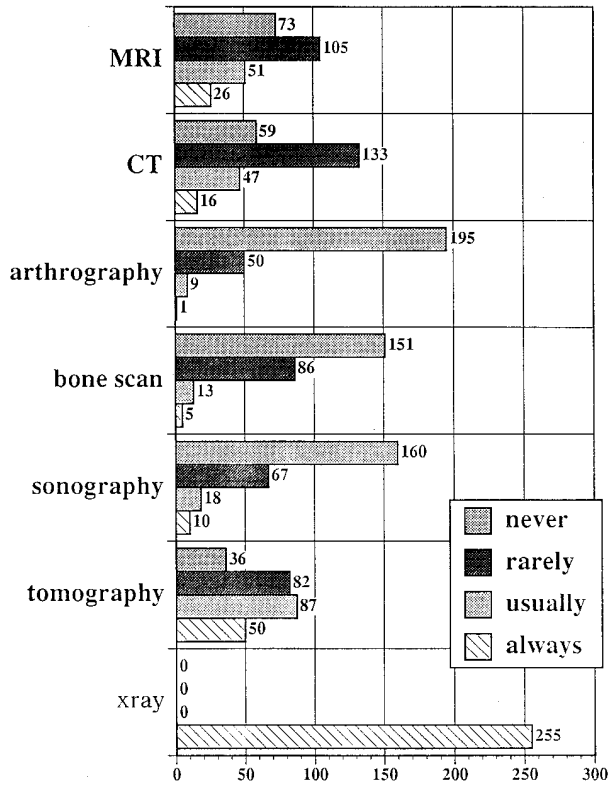


Fig. 1. — Diagnostic modalities that were used in patients with OD.

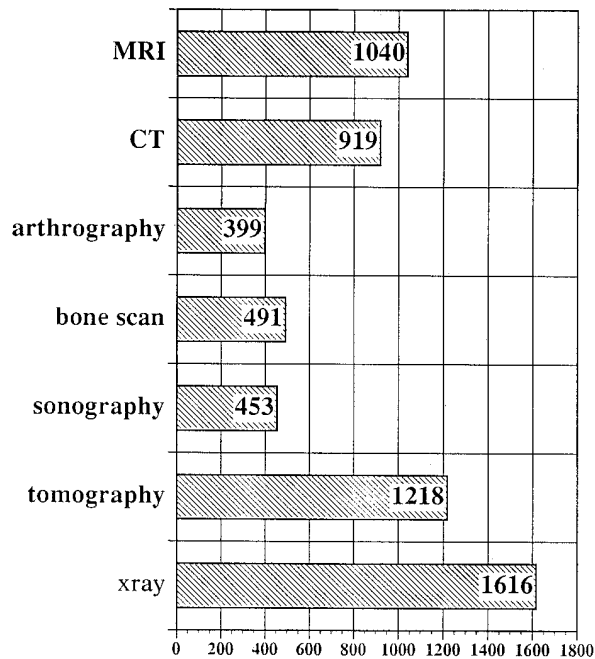
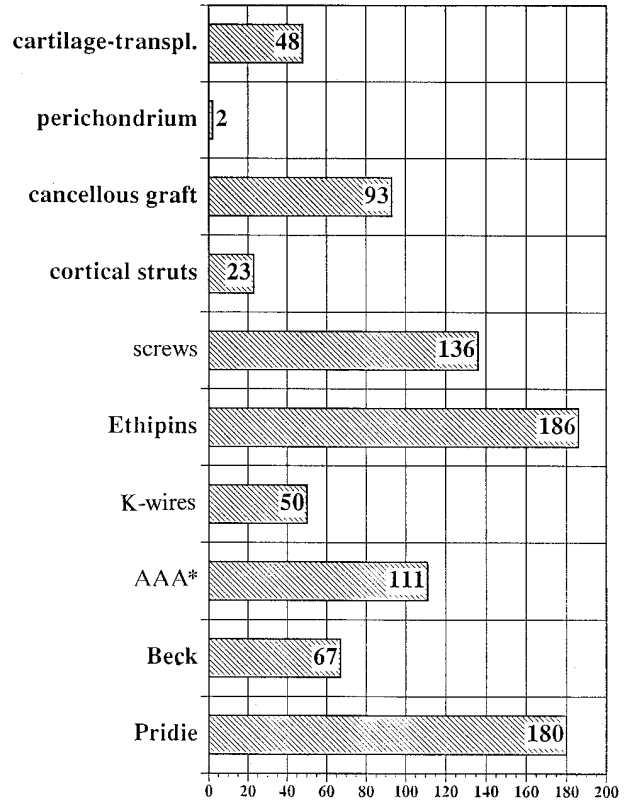


Fig. 2. — Importance of different diagnostic modalities for assessing the indication for surgery.



* Arthroscopic abrasion arthroplasty.

Fig. 3. — Surgical procedures that were preferred in OD.

CASE REPORTS

Diagnostic modalities: The surgeons we asked estimated using MRI in approximately one-third of all cases, whereas the results of the questionnaire show that in the four hypothetical cases MRI was chosen as the diagnostic method of choice in a much higher percentage. Especially in case 1 and case 2 (12-year-old girls) MRI was used almost as often as plain xrays. CT-scan was performed in about 50% of the cases. In older patients the use of MRI was significantly reduced, especially in cases with a loose body (fig. 4).

Therapy: The majority preferred to protect the young patients from weight bearing (case 1). This applied to case 2 as well (asymptomatic patient). Pridie and Beck drillings were performed for induction of new cartilage. For cartilage stabilization

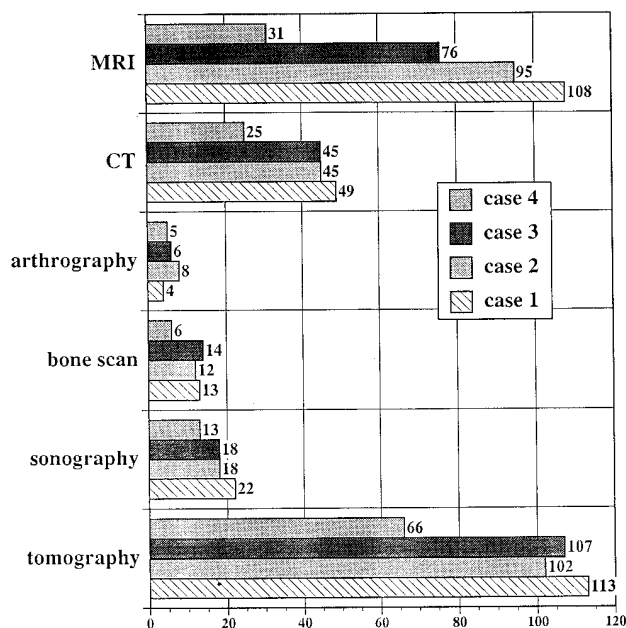


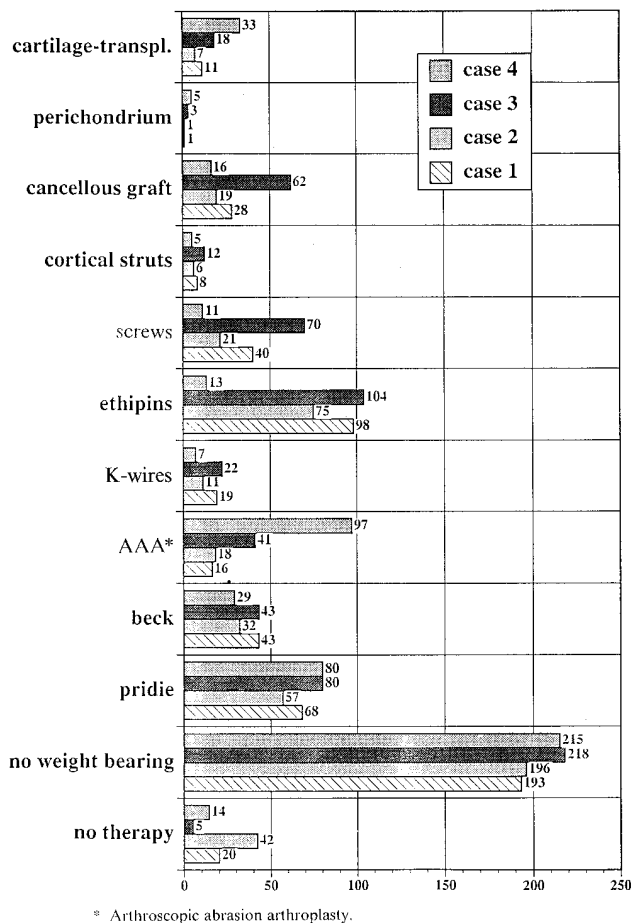
Fig. 4. — Diagnostic modalities that were preferred in each of the four hypothetical cases.

Ethipins were preferred in both case examples, screws were considered less often.

Only approximately 25% of all colleagues refrain from any therapy at all in the asymptomatic female patient. In the hypothetical case of the 12-year-old girl with typical symptoms the number of surgeons who prefer to maintain a passive attitude is less than 15%. In the case of the 24-year-old man with an OD lesion, more aggressive therapy was performed. In this case almost 80% of the surgeons favored weight protection as well. Furthermore, we counted a high number of surgeons who perform cartilage-inducing procedures as well as stabilizing methods in older patients (fig. 5). Regarding the patient with the loose body, most of the surgeons favored a therapy including removal of the loose body and cartilage-inducing procedures. Perichondrium (N = 5) and cartilage transplantations (N = 33) were only rarely recommended.

DISCUSSION

According to our survey most of the surgeons differentiate between OD in the patient with open



* Arthroscopic abrasion arthroplasty.

Fig. 5. — Surgical procedures that were preferred in each of the four hypothetical cases.

and closed epiphyses. This corresponds to the literature reporting different prognoses for OD in adults compared to children (24). Smillie (31) believed in spontaneous healing in early stages of the juvenile types of OD. However, he stated that the later stages of juvenile OD also need surgical treatment. Linden (19) also believed in a considerable spontaneous healing rate in the juvenile type. Federico *et al.* (9) clearly differentiate juvenile OD from the adult type. They recommended treating the juvenile OD patient in a conservative way. Imhoff *et al.* (14) recently evaluated 213 patients with 243 affected knee joints. It turned out that the final outcome was dependent on the age of primary onset. Joint deterioration was found in 34% of the patients under the age of 16. Patients above the age of 16 already showed an increase

of DJD in 69% of the cases within 15 years. Different treatment modalities did not make any difference.

Although most of the German surgeons use MRI for diagnosing and staging OD, there is no information in the literature on the predictive value of MRI findings for patient outcome. Therefore, performing MRI in case of OD may give some visual information, but cannot influence treatment modalities based on scientific data.

If surgery is chosen for treatment, the majority of the surgeons prefer an arthroscopic technique. Guhl was the first who presented arthroscopic methods for the treatment of OD in 1978 (10). Several authors (10, 17) stated that lesions which are more than 1 cm in diameter should be further evaluated and treated arthroscopically. In stages 2 to 4 drilling of the focus through the articular cartilage has often been recommended. This can be easily performed arthroscopically. In contrast to this method the extraarticular retrograde drilling (Beck drilling) and the grafting technique according to Wagner (35) is a safer technique to protect the articular cartilage. However, these techniques need intraoperative xrays.

In stage 5 with partial detachment stable re-fixation of the sequestrum should be achieved. Bent or threaded K-wires (20) and screw fixations (30) in combination with drilling of the mouse bed are recommended. Herbert screws as well as resorbable pins or glueing techniques (5, 6) are also used for this indication (11, 33). Because of the inherent drawbacks of metallic hardware most of the surgeons in the survey preferred resorbable pins.

Cartilage and perichondrium transplantations are rarely performed in Germany. However, Homing *et al.* (12) treated patients, who suffered from huge osteocartilaginous defects, with osteochondral transplants taken from ribs. Among 25 patients he found an excellent incorporation arthroscopically. Similar results were published by Meyers *et al.* (23) who replaced larger osteochondral defects with fresh allografts. In case of varus or valgus deformity the long-term results are clearly worse (34). Several authors therefore not only recommended replacing the lesion by an osteochondral graft (12, 23) in case of extensive

osteochondral defects but also correcting the varus or valgus deformity.

Regarding the uncertain statements of the literature the principle "primum non nocere" is taken into consideration by most of the surgeons in the survey. Consequently the less harmful approach should be used.

An important factor is the differentiation between a juvenile and an adult type. For the juvenile type reduction of physical activity and partial weight bearing for 6-12 weeks is used by most surgeons when the first symptoms occur. If the symptoms do not regress under this regime, the findings can be verified, classified and simultaneously treated in a stage specific approach by means of arthroscopy. During arthroscopy the soft cartilage is drilled, pinned with resorbable pins or drilled using a retrograde approach. The adult type has a considerably higher morbidity. Therefore, the treatment is more aggressive. In adults conservative therapy is rarely successful. After an exact diagnostic evaluation, therapeutic approaches mentioned above are performed arthroscopically or through arthrotomy. Loose bodies in nonweight-bearing joint areas are generally removed, the remaining bony bed is curetted and freshened and probably submitted to abrasion arthroplasty as well. Loose bodies with cartilaginous and bony parts especially in weight-bearing areas are mechanically stabilized with resorbable pins. If the loose body is completely detached from the mouse bed, permanent damage of the surface of the cartilage is to be expected. In some individuals an early osteotomy may be recommended in order to relieve the affected joint compartment.

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SAMENVATTING

J. JEROSCH, I. HOFFSTETTER, R. REER. Huidige therapieconcepten met betrekking tot de osteochondritis dissecans van het kniegewricht — resultaten van een nationaal onderzoek en een literatuurstudie.

In een nationaal onderzoek werden 350 kniespecialisten naar hun huidig diagnostisch concept en hun therapie-

concept bij patiënten met een osteochondritis dissecans (OD) van het kniegewricht gevraagd. Tweehonderdvijfenvijftig vragenlijsten konden worden geanalyseerd. Standaard röntgenopnames werden door alle specialisten gebruikt. Andere beeldvormende technieken die benut werden, waren (in afnemende aantallen) : röntgentomografie, echografie, scintigrafie en tenslotte de arthrografie. De indicatie voor een operatief ingrijpen werd m.n. gebaseerd op de standaard röntgenopnames, gevolgd door de röntgentomografie, de MR en tenslotte de computer-tomografie. M.b.t. kraakbeen stimulerende operatieve technieken werd hoofdzakelijk de „Pridie boring” (antegraad) benut, gevolgd door de „abrasiearthroplastiek” en de „boring volgens Beck” (retrograad). Kraakbeen- of perichondriumtransplantaties werden slechts zelden verricht. Ter fixatie van losse fragmenten prefereerden de specialisten „Ethipins” gevolgd door schroeven en Kirschnerdraden. Terwijl in het algemeen de MR slechts bij 1/3 van de patiënten benut werd, was dit percentage veel hoger bij specifieke vraagstellingen. De MR werd bijna net zo vaak als röntgenopnames gebruikt bij jonge patiënten. Bij oudere patiënten werd de MR echter relatief zelden benut. M.b.t. de therapieconcepten liet de meerderheid van de specialisten jonge patiënten onbelast mobiliseren. Voor de stabilisatie van het kraakbeen werden „Ethipins” geprefereerd, terwijl schroeven zelden gebruikt werden. Ongeveer 25% van de specialisten behandelt asymptotische patiënten niet. Bij patiënten met klassieke symptomen is dit percentage minder dan 15%. Bij volwassenen waarbij de gewrichtsmuis zich nog in zijn „bed” bevindt, is de therapie in het algemeen veel agressiever. Bij patiënten met een gewrichtsmuis worden de kraakbeen inducerende behandelingen geprefereerd. Perichondrium- of kraakbeentransplantaties worden zelden verricht.

RÉSUMÉ

J. TEROSCH, I. HOFFSTETTER, R. REER. Modalités de traitement de l'ostéochondrite disséquante du genou. Résultats d'une étude multicentrique allemande.

Dans le cadre d'une étude multicentrique nationale il fut demandé à 350 chirurgiens du genou de préciser leur

techniques de diagnostic et de traitement de l'ostéochondrite disséquante du genou : 255 réponses furent analysées. En ce qui concerne l'imagerie, la radiographie standard est demandée par tous les chirurgiens. D'autres techniques furent utilisées dans l'ordre de préférence décroissant suivant : tomographie. RMN, échographie, scintigraphie et arthrographie.

L'indication chirurgicale dépendait en premier lieu de l'aspect des clichés standard et ensuite (en ordre décroissant) de la tomographie, de la RMN et la tomodensitométrie. Comme méthode de traitement induisant la formation de cartilage, la préférence fut donnée aux forages de Pridie (antégrades) ; suivent, en ordre décroissant : l'arthroplastie par abrasion et les forages de Beck (rétrogrades). Des transplantations de cartilage et périchondre furent rarement pratiquées. Pour la fixation d'un fragment libre, la plupart des chirurgiens donnent la préférence aux «Ethipins», en seconde position viennent les vis et les broches de Kirschner.

Un tiers seulement des chirurgiens considèrent la RMN comme l'outil diagnostique principal ; un nombre plus élevé de chirurgiens n'ont recours à la RMN que dans les cas spéciaux. Chez des patients jeunes la RMN est utilisée aussi souvent que la radiographie standard, alors que chez les patients plus âgés on a nettement plus rarement recours à la RMN. Au plan du traitement, la majorité des chirurgiens traitent les jeunes malades par la mise en décharge. Pour la fixation du cartilage, les «Ethipins» ont la faveur alors que les vis sont rarement utilisées. Environ 25% des médecins ne traitent pas les lésions asymptotiques. Moins de 15% des chirurgiens ne traitent même pas les patients présentant des symptômes typiques.

En général les adultes souffrant d'une ostéochondrite disséquante avec fragment en place sont traités de manière plus agressive. En cas de corps cartilagineux libre, la faveur est donnée aux techniques induisant la formation de cartilage. Des transplantations de cartilage ou de périchondre sont rarement pratiquées.