

TORN CONGENITAL DISCOID MENISCUS OF THE KNEE

CASE REPORT AND REVIEW

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Torn meniscus of the knee joint in young children appears to be a rare injury, even if an associated congenital anomaly of the cartilage is present. A case of congenital discoid cartilage presenting as an 'internal derangement of the knee', and proving at operation to be a torn cartilage is described.

CASE HISTORY

A female child R.V. aged 6 years and 9 months, was seen at the orthopaedic outpatients department on 16 April 1957. Six days previously, whilst playing, she was pushed and fell against a large stone, twisting her knee as she fell. The left knee became swollen and, although this had now almost subsided, it was still painful. Because of the pain she was unable to walk or extend the leg fully. Nothing of note in the previous history.

Pulse rate 90 per minute. Temperature 98.4°F. No abnormalities detected on general examination.

The right knee was normal on examination. The left knee was slightly swollen, there was no erythema; skin temperatures were equal on the two legs. The knee was held in 10° flexion; flexion-extension movements caused pain at the lateral aspect of the knee joint; there was a block to full extension. Movement was painful and only possible between 170°-90°. A tense, slightly tender swelling was palpable on the joint line antero-laterally, about half an inch in diameter, and this was not attached to the skin.

A diagnosis of internal derangement of the knee, possibly with a cyst of the lateral meniscus, was made and the child was admitted to the ward.

The patient did not improve on skin traction and on 29 April arthrotomy of the knee joint under general anaesthesia and a bloodless field was performed through a lateral vertical incision between the ilio-tibial tract and the patellar tendon with the knee in 90° flexion. The interior of the knee revealed a thickened disc-shaped, lateral cartilage with a transverse tear in the middle of the central portion and the meniscus was removed *in toto*. The post-operative period was uneventful and the child was discharged on 11 May 1957.

DISCUSSION

In view of the rarity of internal derangements of the knee in children of this age a review of the literature is presented.

Although discoid cartilages of the knee had been noted previously in anatomical dissections, the first clinical case was

described by F. Kroiss in 1910. It was associated with a tear of the pathological cartilage. Since then 50 cases have been described. A list of such cases appears below, showing those with a definite history of trauma:

1910..	..	F. Kroiss	..	..	1 case with super-added tear.
1928..	..	A. Schulz	..	..	2 cases (1 traumatic).
1934..	..	J. G. Finder	..	..	3 cases (1 traumatic).
1935..	..	E. Bell-Jones	..	..	14 cases (8 traumatic).
1935..	..	W. Jaroschy	..	..	3 cases (1 traumatic).
1936..	..	A. G. Timbrell-Fisher	..	..	2 cases (1 traumatic).
1936..	..	D. Stewart Middleton	..	..	4 cases (1 traumatic).
1945 and		E. Cave and O. Staples			7 cases (6 traumatic).
		previously			
1948..	..	I. S. Smillie	..	..	29 cases.
1957..	..	E. B. Kaplan	..	..	6 cases.

Incidence

Of all meniscal injuries reported, only a small fraction is associated with intrinsic abnormality of the cartilage itself. Cave and Staples in a series of 164 cases requiring meniscectomy described only 4 as having the congenital discoid pathology; less than half of such cases in the literature were associated with trauma. In the series of 1,300 cases of meniscectomy reviewed by Smillie only 29 congenital discoid menisci were found.

Age and Sex

The writers on all series of cases requiring operation for damaged menisci agree that the tear is seen most commonly in active sporting enthusiasts between the ages of 20 and 30. In his review of 256 cases Melville Henderson tabulated the age incidence as follows:

Age in Years	No. of Patients
10-19	27
20-29	116
30-39	66
40-49	37
50-59	9
60-69	1

MacAusland in 1931 stated that the average age at operation in 388 cases was 21 years. In the cases associated with a discoid abnormality the age was younger. In the whole series only 2 cases presented under the age of 10 years. Case and Staples in 1941, reviewing 7 cases of discoid menisci, found the average age at operation to be 14 years. The present case appears to be one of the youngest recorded.

Recent reports on meniscectomy for ruptured meniscus agree that the ratio of female cases to male is 1 to 3 or 4. Of the cases associated with the defect under discussion, the series is too small for adequate assessment, but the numbers appear to be about equal.

Anatomy and Etiology

No report of medial discoid cartilages occurs in the literature. Two cases presented with bilateral abnormality of the lateral menisci.

Jaroschy, in his studies of comparative anatomy, expressed the belief that the highest evolutionary level of life in which a discoid cartilage occurred normally was the lizard. Recently Kaplan, after dissecting animals representing species of amphibians, reptiles, birds and mammals, found no disc-shaped cartilages in any of these life forms; certain of them, however, normally exhibited a circular meniscus. He has also investigated the embryology of the normal cartilage in man and concludes that at no time from the earliest days of development does a disc-shaped meniscus occur in the foetus. The semilunar shape of cartilage is laid down early in the mesenchymal plate, interposed between tibia and femur. Observations made at the removal of discoid menisci show that no attachment of the posterior horn to the tibial platform exists. Instead, a continuous menisco-femoral ligament (ligament of Wrisberg) links the posterior horn of the meniscus with the lateral side of the medial condyle of the femur. This is similar to the arrangement in animals other than man. He concludes that the pathological condition now under discussion represents the final dynamic state of a congenital anomaly of the attachment of the posterior horn of the meniscus, the discoid shape being a hypertrophy of a semilunar cartilage caused by abnormal movements allowed by the defect.

This view is contrary to the following widely held theory of the etiology of the condition: It is believed that, when cartilage is deposited in the mesenchymal plate which is interposed between the tibia and femur in the foetus, it does so in a disc shape. Normally this shape is modified into that of the adult semilunar cartilage. It is believed that in the condition under discussion this re-absorption does not take place.

Clinical Presentation

Cases of discoid meniscus have presented in two clinical ways, viz. with or without trauma. The trauma may be severe or minimal.

1. *Without Trauma.* The outstanding complaint is a snapping sensation in the knee, accompanied by a jar, thud or click, when the knee is extended. It is sometimes associated with pain and episodic effusions into the joint. Movements are frequently unrestricted. Occasionally a tender mass is palpable along the joint line.

2. *With Trauma.* An internal derangement of the knee

following injury is seen at a younger average age than the usual Torn Cartilage case. It is in this category that the present case falls.

Anatomical Dissection. Reports of discovery of the condition on dissection are found, in the literature, but no figures of the incidence are given.

Treatment

All cases in the literature were proved by meniscectomy and it is agreed that the operation cures the condition.

CONCLUSION

The condition of discoid lateral cartilage of the knee, whatever its mode of presentation, is an unusual entity. It is even less common when occurring in association with a super-added tear.

A review of the literature on comparative anatomy of the knee cartilages throws doubt on the presence of the discoid shape in animal life other than man. Doubt is further thrown on the theory that this condition in man is of congenital etiology; a theory is discussed which suggests that the anomaly is one affecting the attachment of the posterior horn, the discoid shape being a secondary hypertrophy following abnormal mechanics and stresses on the cartilage.

SUMMARY

A case is presented of internal derangement of the knee in a female child 6 years and 9 months old. Operation proved the case to be one of torn lateral cartilage, with a congenital discoid anomaly as the underlying pathology. Meniscectomy was successfully performed.

The case presented appears to be of interest because of the very young age of the child and the rarity of the condition described. Although the literature records few cases of discoid lateral menisci, most orthopaedic surgeons agree that the defect itself is not such a rare abnormality; it is the association of the condition with a tear of the cartilage that is unusual.

A review of the literature and discussion of the condition is presented.

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REFERENCES

- Bell-Jones, E. (1935): *Lpool Med.-Chir. J.*, **43**, 78.
 Bristow, W. R. (1939): *Amer. Surg.*, **43**, 458.
 Campbell, W. C. (1956): *Operative Orthopaedics*, 3rd ed., vol. 1, p. 355. St. Louis: Mosby.
 Cave, E. F. and Staples, O.S. (1941): *Amer. J. Surg.*, **54**, 371.
 Finder, J. G. (1933): *J. Bone Jt. Surg.*, **16**, 804.
 Henderson, M. S. (1930): *Surg. Gynec. Obstet.*, **51**, 720.
 Jaroschy, W. (1935): *Beitr. klin. Chir.*, **161**, 139.
 Kaplan, E. B. (1957): *J. Bone Jt. Surg.*, **39**, 77.
 Kroiss, F. (1910): *Beitr. klin. Chir.*, **66**, 598.
 MacAusland, W. R. (1931): *Ann. Surg.*, **93**, 649.
 McMurray, T. P. (1942): *Brit. J. Surg.*, **29**, 407.
 Middleton, D. S. (1936): *Ibid.*, **24**, 94 and 246.
 Schulz, A. (1928): *Arch. orthop. Unfall-Chir.*, **26**, 315.
 Smillie, I. S. (1946): *Injuries of the Knee Joint*. Baltimore: Williams and Wilkins Co.