

THE TREATMENT OF FEMORAL FRACTURES IN CHILDHOOD

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Fracture of the femoral bone in childhood is one of the severest locomotor apparatus lesions, and its treatment is invariably performed under in-patient conditions. The femur is the longest and thickest tubular bone in the child's organism; it provides for reinforcement of the framework of the most powerful muscle group, conditioning the function of two major articulations—the hip and knee joint.

Subperiosteal shaft fractures with longitudinal and transverse displacement are rare. Displacement of the fragments renders necessary hospital treatment with application of both conservative and operative methods. The incidence of femoral fractures differs according to various authors. In the opinion of Damje it amounts to 19.7 per cent, Smolyak — 43 per cent, Mannheim — 29 per cent and Genova — 25.20 per cent, while according to our case material it amounts to 32 per cent of all fractures subjected to in-patient treatment.

Over a 17-year period (1957 through 1973), a series of 252 children with femoral fractures were studied. They include newborns, sucklings and children up to 14 years, all treated at the District Hospital — Varna, orthopaedic department, actually the Chair of Orthopaedics and Traumatology. Of the total number, 190 (74.40 per cent) are boys, and 62 (24.60 per cent) — girls. It is obvious and rather significant that the incidence of fractures among boys is three times higher than in girls. This is attributed to the characteristic boyhood behaviour and manifestations (virility, courage, bravery), impetuosity, strive for independent acts, absence of acquired reflexes and self-reliance in the surrounding milieu. The highest is the incidence of fractures among children aged 3 to 7 years (30.16 per cent).

Table 1

Type of Traumatism (in %)

Home — 51	Intrapartum — 1.65
Traffic — 24.75	Pathological fractures — 1.1
Sports — 4.45	Obscure mechanism — 11.2
Farming — 2.75	

Home injuries are the most frequent cause of femoral fractures, next ranking traffic traumatism and on the third place — athletic injuries. The transport lesions are the heaviest.

Table 2

**Anatomical Localization of the Fracture in a Series
of 179 Patients**

Localization	Number	Percentage
Shaft	154	86.03
Supracondylar	9	5.02
Distal epiphyseolysis	3	1.68
Basicervical	3	1.68
Pertrochanteric	3	1.68
Subtrochanteric	7	3.91
Total	179	100.00

It can be seen from Table 2 that the highest is the percentage of shaft fractures — 86.03, while the other localizations are much rarer. Contrarily, in adults the incidence of the other localizations is much higher. Some of the fractures, such as basicervical and hip dislocations, lead to severe arthrosis changes within a period of five years.

Insofar as type and mechanism of the fracture, assessed by the X-ray image, are concerned, they are classified in the following way: transverse shaft fracture — 36.86 per cent, oblique shaft fracture — 25.14 per cent, torsion fracture — 37.90 per cent. In transverse fractures, the trauma inflicting agent acts directly, whereas in oblique and torsion fractures where the mechanism of torsion along the longitudinal axis of the femur plays a primary role, it acts indirectly.

Open fractures are most frequently observed in traffic injuries, and in some cases they are accompanied by lesions of parenchymatous organs (spleen, liver, urinary bladder, etc.). As a rule, the treatment of the children in all cases was conservative, but the results of the tactics adopted were not invariably good. The total number of children treated conservatively amounts to 113 (44.90 per cent), and of those treated operatively — to 139 (55.10 per cent). Surgical management has not been the method of choice, nor in vogue in our practice, but anyway, necessity has imposed it. The results of surgery were very good.

We reported on the operative treatment using metal osteosynthesis as far back as 1967 and 1970 — a period when authors as Damje and others believed that internal metal fixation in children should be considered as a mistake. In 1970 Damje was no longer in the same opinion, and wrote that there were a number of indications justifying its application. The methods of conservative management applied include: 1) Single stage manual traction and reposition with pelvipodal cast dressing in 9.44 per cent of the children, without any success. 2) Traction after Schede, applied in 31.8 per cent of the children. With the latter procedure, not infrequently, the side view X-ray shows a substantial dislocation. It is possible that internal rotation of the extremity leads to increased femoral neck anteversion. Hence,

nowadays, we prefer to use indirect and direct traction with a splint which permits a better reduction and overcoming of the dislocation. 3) Indirect traction was employed in 2.74 per cent, and direct traction — in 3.32 per cent of the patients.

Among the surgical procedures, intramedullary osteosynthesis ranks first — 106 cases (72.26 per cent). It yields the optimal results, and in six cases it was accomplished with a thick Kirschner wire. Usually, it was a matter of fractures of the femur in newborns and sucklings. Cerclage was used in 19.42 per cent of the children — rather frequently up to 1964. Actually, it is applied only as a complementary fixation of the fragments or bone grafts, but never as a primary fixing device. A plate with screws was used in four children, with poor outcome. In some cases reoperation with resorting to intramedullary osteosynthesis was mandatory. In two children internal fixation was made with screws only. The latter method, applied in oblique fractures, is an error from the point of view of surgical art. In both children coxa vara was the ultimate outcome. The results of metal osteosynthesis are very good provided the technique of the procedure and the choice of osteosynthetic material are strictly abided to. Of the six children with supracondylar fracture, followed up thus far, only in one a limitation of the knee function and insignificant hypotrophy of the hamstrings ensued. In another child the unsuitable nail (for antebrachium) fractured with subsequent retrocurvature development, and in two there were complications due to local osteitis (one of the fractures was open). Among the 100 children followed up, coxa vara was also observed — 10 cases or 19.23 per cent. In one of the children the nail has not been removed for seven years, while the other one sustained repeated fractures of the femur, and was thereby subjected to repeated intramedullary osteosynthesis. Of course, the apophyseal damage of trochanter major has an essential practical bearing, especially if the lesion is along its inner margin. Coxa valga was also observed during the conservative treatment of 15 children. Whether or not fractures near by the apophysis are to be blamed for the occurrence of coxa valga or else, bone regeneration in these cases involves the entire femur, are questions still awaiting solution. It was established that the femur is endowed with compensatory possibilities in terms of length and shape, but they are by no means unlimited. In a patient with poorly reduced torsion fracture, after the sixth year, the femur was shortened with 1 centimeter. In this case even the bony structure was not completely restored. The osteogenetic regeneration capacity after femoral bone fracture is traced in a dynamic follow-up of children with fractures, sustained over the period 1973 through 1974.

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О ЛЕЧЕНИИ ПЕРЕЛОМА БЕДРЕННОЙ КОСТИ В ДЕТСКОМ ВОЗРАСТЕ

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РЕЗЮМЕ

Автор сообщает о стационарном лечении 252 детей с переломом бедренной кости с самой частой локализацией в диафизе. В 44,90% случаев лечение было консервативным, а в 55,10% — оперативным. Оперативное лечение предпринималось при отсутствии успеха проведенного консервативного лечения и порочном сращении перелома. Он считает, что порочно сросшиеся переломы и те, которые не удается вправить консервативно, представляют собой абсолютное показание для оперативного лечения. Результаты оперативного лечения очень хорошие и автор считает, что остеосинтез металлическим гвоздем, конкретно для бедренной кости в детском возрасте, применим и подтвержден практикой. Лучшей техникой является интрамедулярный остеосинтез. Она является самой стабильной для бедренной кости и удаление штифта происходит легче всего.