

# THE ROLE OF SURGERY IN CEREBRAL PALSY

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## SYNOPSIS

**Fifty cases of 'Cerebral Palsy' with operative treatment were reviewed. No child was made worse after surgery. Ambulation and function had improved in all cases, but in varying degree. It is emphasized that a group effort is essential in the management of these children. Poor results from the surgery of cerebral palsy are mainly from patients with contractures are either operated on inadequately, or too late, or not in the correct sequence.**

## INTRODUCTION

Cerebral palsy refers to a group of motor disturbances which is essentially static. Apart from the disturbance of the musculo-skeletal system, these children also have varying involvement of sight, hearing, speech and intelligence. It cannot be emphasized more, that in the management, the child as a whole must be treated and a group effort is essential. The paediatrician, the therapists, the social worker and the parents, all play a very important part. There are great variations in these children. Some with severe involvement will not even roll over much less sit or walk, whereas others with milder involvement have the potential of becoming a useful member of society.

The aim of surgery is to make the patient ambulatory with or without equipment and to achieve the best functional use of his involved extremities.

## CLINICAL MATERIAL

Fifty cases of cerebral palsy who had one or more operative procedures were reviewed at the University Department of Orthopaedic Surgery, Singapore General Hospital. A total of seventy-five operations were performed on these children of which thirty were on the feet, ten around the knees, twenty-nine around the hips and six around the wrist. The follow-up period ranged from two to five years, the average being three

years. The results were classified as improved or not improved. No child was made worse after surgery. Ambulation and function had improved in all cases but in varying degree.

## RESULTS AND DISCUSSION

The most important point to note is that surgery was not an end in itself, but formed a part of the planned programme in the total management of the patient. The object of surgery is to facilitate training and rehabilitation and to make the task simpler for the therapists.

Keeping this in mind, the surgical treatment has to be tailored to the requirement of the individual case. The success of any surgical procedure will depend upon:

1. General assessment of the patient so that he is at least moderately intelligent and can co-operate in the post-operative rehabilitation programme.
2. Understanding of the basic pathomechanics of the deformities so as to decide on the right type of operation for that particular child.

Before embarking on any surgical procedure, every child should undergo a period of conservative treatment and should be assessed closely by the therapist on his general functional progress. Surgery is indicated for correcting the fixed deformities and sometimes for inhibiting the spastic muscles.

Various surgical procedures on bones, muscles, tendons and nerves have been advocated from time to time. In general, surgical treatment is more successful for the lower limbs than for the upper limbs. Not all deformities need to be corrected nor is it advisable to do so, specially in older children. A child with a fixed deformity at the hip which is well compensated at the knee and ankle and who can keep himself

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reasonably mobile, should be left alone. Trying to correct the static deformities will change his body image and result in a poor balance, although the correction of deformities might provide some cosmetic improvement.

The postural abnormalities that occur in cerebral palsy are due to spastic contracture or soft tissue contracture or bony deformity. The operative procedure is selected depending upon the type of contracture and the joint involved.

### Hip Deformities

The primary deformities that are encountered at the hip are flexion alone or flexion combined with internal rotation or adduction. If uncorrected at an early stage they lead to secondary changes in the bones and joints. They develop valgus deformity and increased anteversion of the femoral neck which lead further to subluxation and dislocation of the hip. Early correction of the primary deformity is essential.

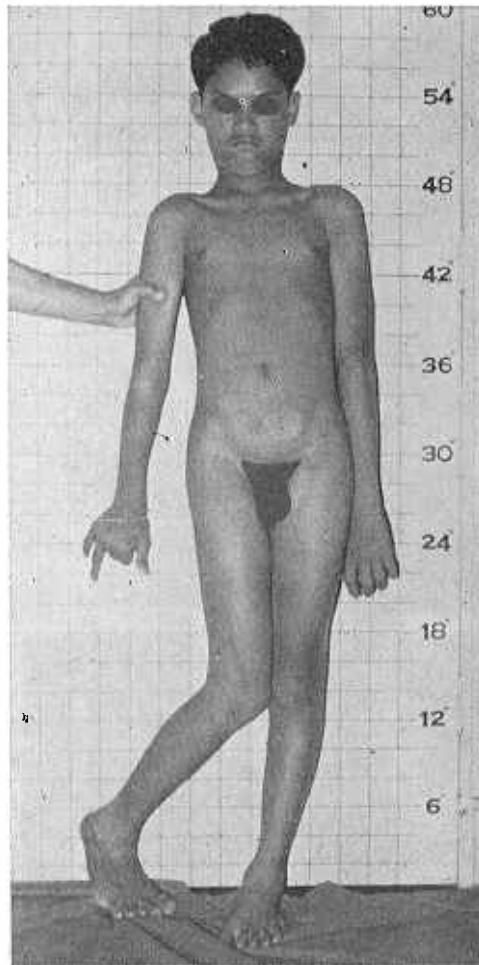


Fig. 1.

Flexion internal rotation is the commonest deformity (Fig. 1) encountered. This is primarily due to spastic internal rotators acting against weak or flaccid external rotators. The deformity is further exaggerated by the poor postural habit of sitting in the 'reverse tailor position' (Fig. 2). This position further increases the anteversion of the femoral neck and associated deformity of the external torsion of the tibia and planovalgus deformity of the foot.

In older children, the most effective form of correction is by subtrocantalic rotation osteotomy of the femur. Post-operatively in addition to internal fixation, these children should be immobilised in a hip spica because the internal fixation alone is not strong enough to counteract the spasm. Rotation osteotomies were performed in five cases and the results were uniformly successful.

Flexion deformity of more than  $20^\circ$  in younger or in older children when not well compensated should be corrected by surgical means. In patients who had flexion deformity between  $20^\circ$  to  $40^\circ$  and could walk independently without crutches, release of the tensor fascia femoris, sartorius, rectus femoris and anterior fibres of the gluteus medius and minimus was



Fig. 2.

performed. There were seven in this group. Appreciable correction of flexion deformity was achieved in 90% of the cases.

In those cases where flexion deformity was more than 40° and those who required external support to walk, Ilio-psoas tenotomy was uniformly successful. There were eleven cases in this group and all showed improvement.

Psoas tenotomy permanently weakens the flexor power of the hip and is indicated only when crutches are necessary for ambulation.

The management of hip dislocation or subluxation in the spastic child has been discussed at length in the literature.<sup>1,4,5,8</sup> The important thing is to prevent dislocation and this can be done by early correction of flexion, adduction and internal rotation deformity. Ilio-psoas and adductor tenotomy with obturator neurectomy was done with encouraging results. It not only prevented further subluxation but in some cases the femoral head became well contained in the acetabulum (Fig. 3). In well established cases, major surgical procedures (Fig. 4) were

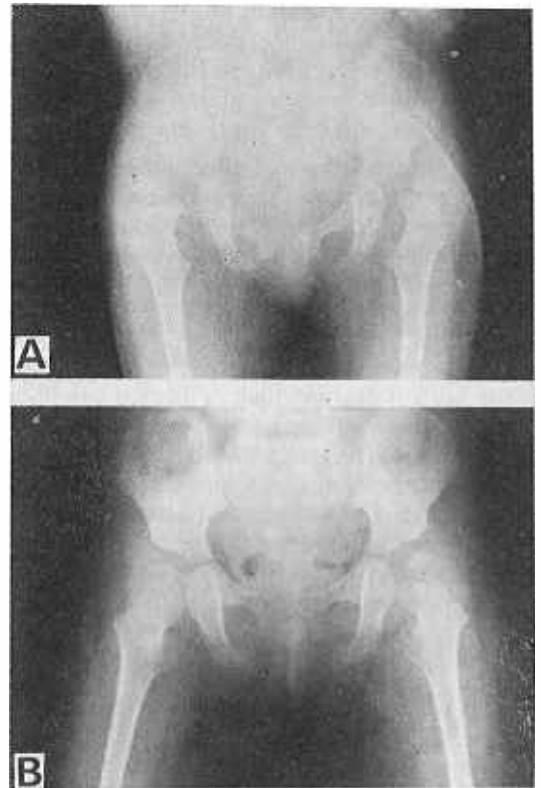


Fig. 3.

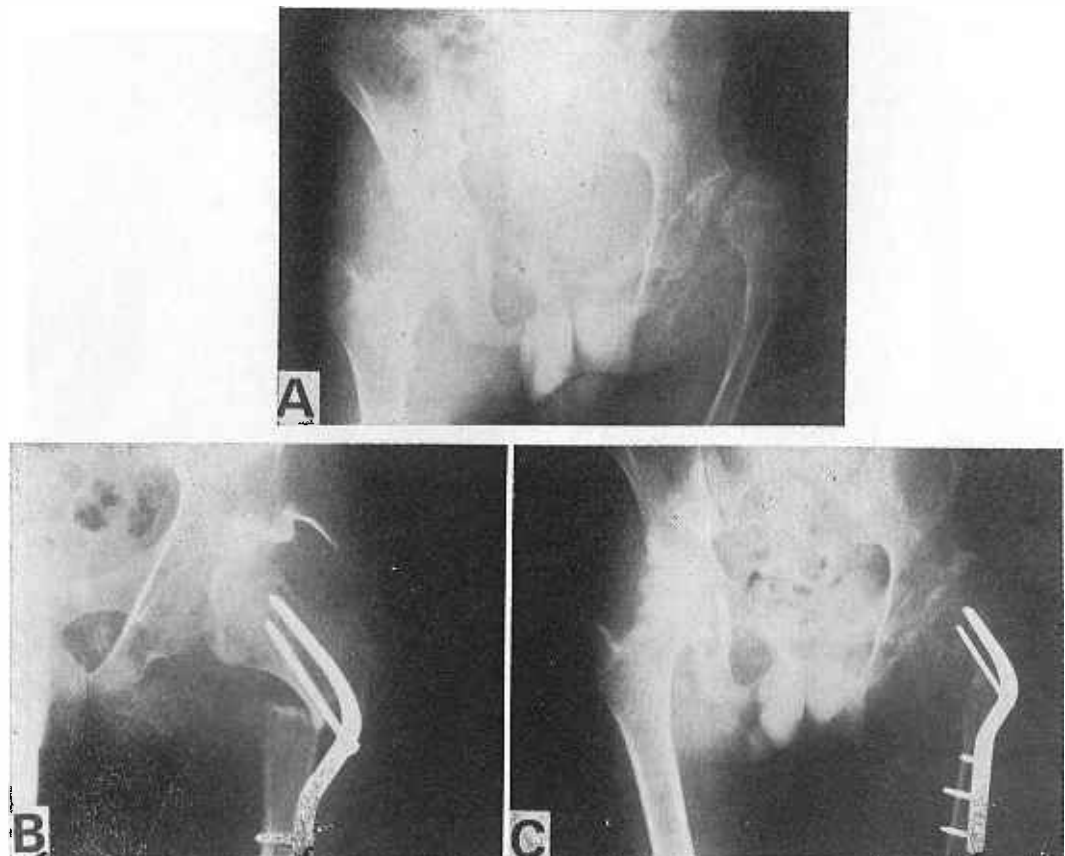


Fig. 4.

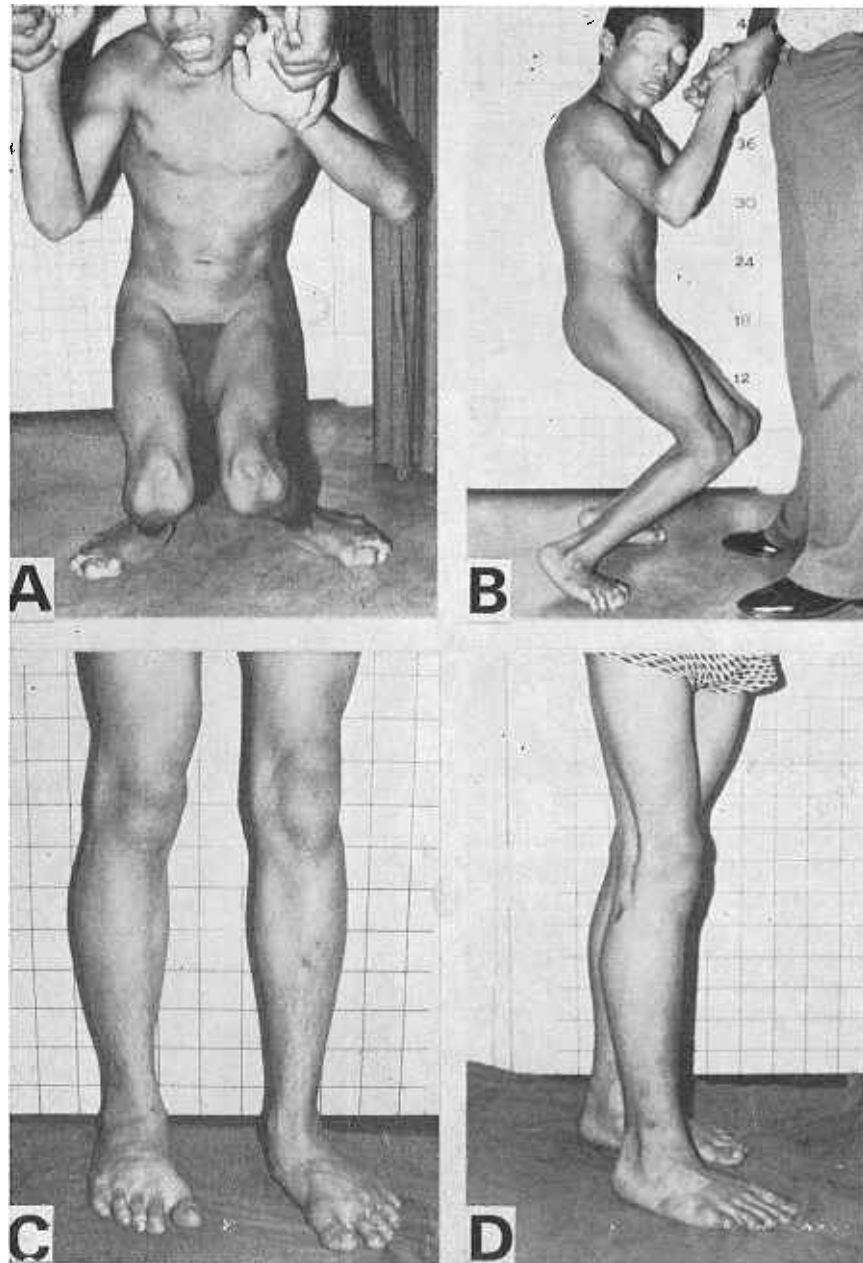


Fig. 5.

necessary but were often not worthwhile in these children, considering their other disabilities. They might have been better left alone or the femoral head could have been excised in those with painful hips.

#### Knee Deformities

The main deformity at the knee was flexion (Fig. 5). This could primarily be due to muscle

imbalance, or secondary to hip flexion or equinus at the ankle.

When the knee deformity was primary, it was corrected by a modified Egger's operation.<sup>3</sup> The biceps, semitendinous and gracilis were transplanted to the lower end of the femur and if necessary, the semimembranosus was lengthened. There were ten cases in this group. The post-operative results were encouraging in all of them and none developed recurvatum.



Fig. 6.

### Foot Deformity

The most common was the equinus deformity at the ankle (Fig. 6). Early correction was essential to prevent the development of genu recurvatum or equino-valgus deformity of the foot (Fig. 7). In general, we preferred elongation of tendo-Achillis (Fig. 8) rather than gastrocnemius slide as our long term follow-up showed more recurrence after the 'slide operation'.

For severe valgus deformity, extra-articular arthrodesis or displacement calcaneal osteotomy have been encouraging. For equinovarus deformity in early cases, lengthening of the tibialis posterior and or Dwyer's calcaneal osteotomy (Fig. 9) gave satisfactory results. For late cases, wedge tarsectomy gave uniformly good results (Fig. 10).

To conclude, surgical treatment in properly selected cases has an important place in the total management of these children. In our



Fig. 7.

experience, inadequate or poor results from the surgery of cerebral palsy are mainly due to the fact that the patients with contractures are operated on inadequately or too late or not in the correct sequence. Early surgery is advocated but one must not forget that it is only a part in the total management of these children.

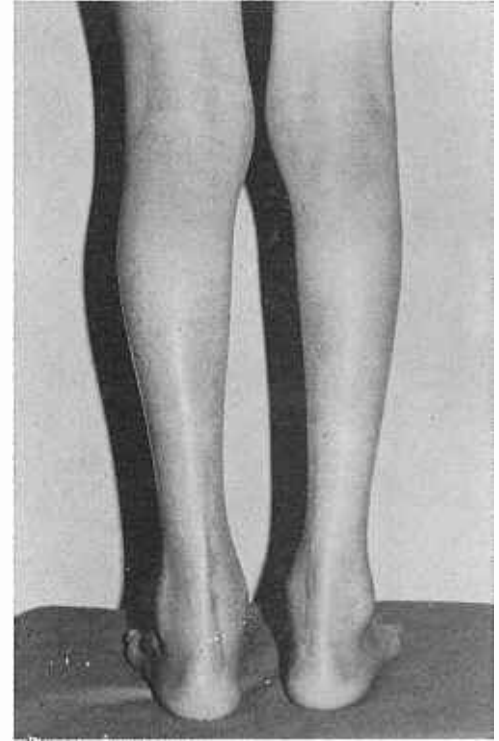


Fig. 8.

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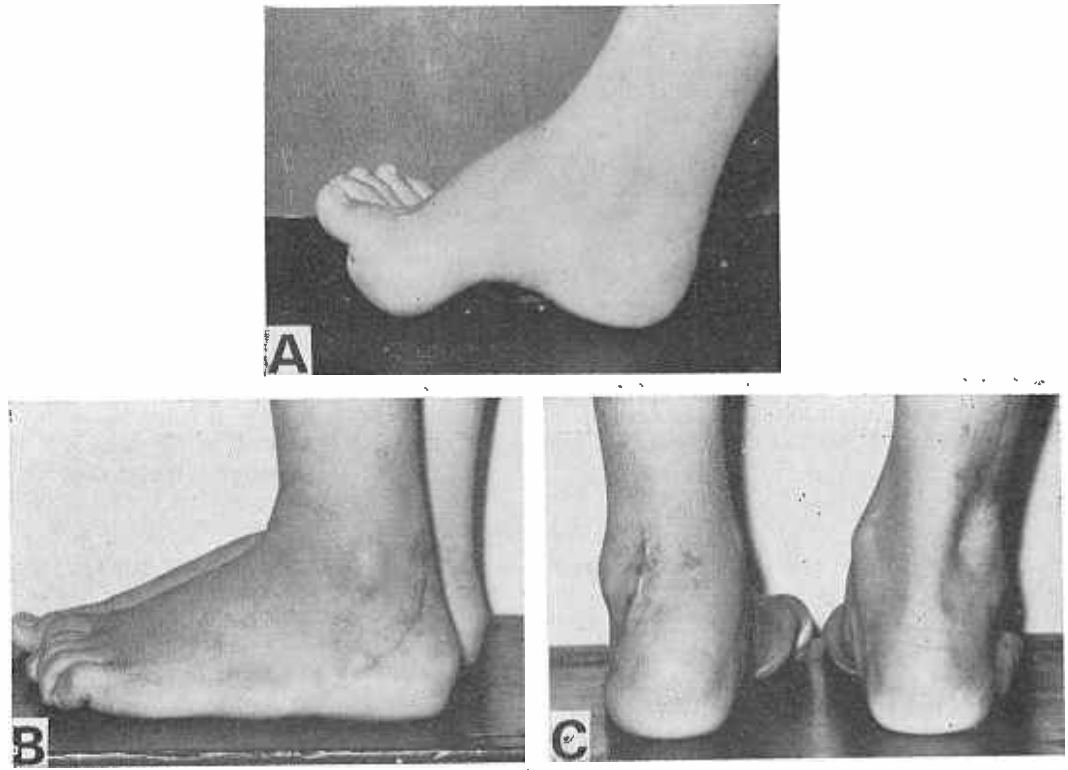


Fig. 9.

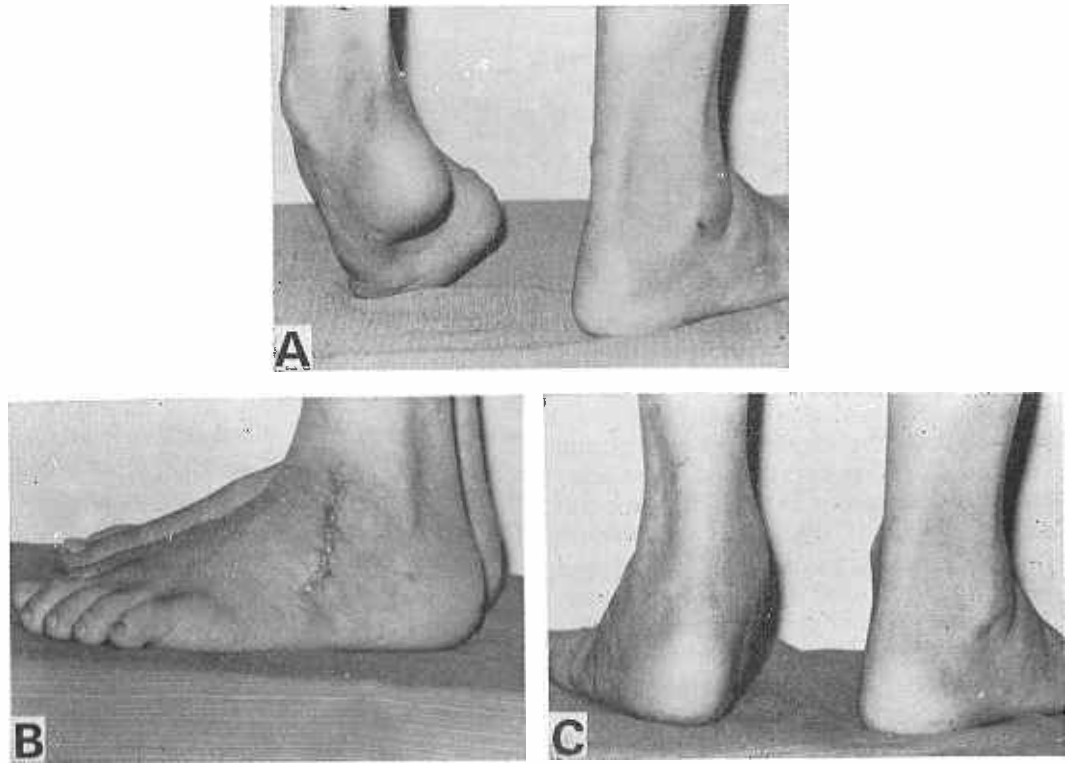


Fig. 10.

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