# Case Report

# Innovative Surgical Treatment of Cerebral palsy

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## Abstract

*Cerebral palsy means partial brain paralysis, like facial palsy where facial nerve is paralyzed. It is mainly due to birth induced asphyxia others a lot of causes also present. Convulsion is most common symptoms of cerebral palsy. This convulsion leads to further hypoxia which leads to further brain damage. Indirectly it is permanent and progressive disorder. Ultimately patient is unable to walk, communicate and perform normal life. Birth asphyxia leads to hyperostosis of skull bone. Premature closure of sutures specially fontanelle. Early closure of sutures of skull and fontanelle. At the same time temporal fossa is small and commonly temporal bone thickened excessively as a sequalae total intracranial volume decreased and which restrict to expansion of brain uniformly. As the age advances simultaneously brain also increase at its maximum level up to 5 years but rigid skull doesn't allow the expansion of brain due to early closure of suture .and excessive growth of bones even in skull base. Temporal bone also exceptionally thickened. Normal as usual treatment failed to cure cerebral palsy patients. This new cranial vault reorganization or reconstruction by Bilateral cranioplasty and duraplasty giving surprising result of these cerebral palsy patients. This case hase been operated in Khwaja Yunus Ali Medical College and Hospital, Enayethpur, Sirajganj, Bangladesh. Patient's appearance become quite normal just after operation.*

***Key words:*** *Cerebral palsy, Birth asphyxia, Convulsion, Cranioplasty, Duraplasty.*

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## Introduction

Cerebral palsy is a group of permanent disorders affecting the development of movement and causing a limitation of activity. Non-progressive disturbances that manifest in the developing fetal or infant brain lead to cerebral palsy.[1] It is the most common cause of childhood disability. The degree and type of motor impairment and functional capabilities vary depending on the etiology. Cerebral palsy may have several associated co morbidities, including epilepsy, musculoskeletal problems, intellectual disability, feeding difficulties, visual abnormalities, hearing abnormalities, and communication difficulties. Treatment of cerebral palsy should take an interprofessional approach. There are different causes of cerebral palsy; like Prenatal Causes -Intrauterine infections. Perinatal Causes-Hypoxic-ischemic insults, Central nervous system (CNS) infection. Postnatal Causes CNS infections, Anoxic insults .[2,3] Other risk factors associated with cerebral palsy are multiple gestation, intrauterine growth restriction, maternal substance abuse, preeclampsia, chorioamnionitis, abnormal placental pathology, meconium aspiration, perinatal hypoglycemia, and genetic susceptibility.[4,5] Cerebral palsy is the most common cause of childhood disability. It occurs in 1.5 to 2.5/1000 live births.[6] The prevalence is significantly higher in infants born prematurely than infants born at term. The risk of developing cerebral palsy increases with declining gestational age with infants born at less than 28 weeks gestational age being at most risk.[6] The prevalence is also higher in low birthweight infants. Very low birth weight (less than 1500 grams) infants born are at greatest risk; 5% to 15% of infants born weighing less than 1500 grams develop cerebral palsy.[6] Prenatal events cause approximately 80% of cerebral palsy cases.

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## Case Report

A 2 year and 7-month-old boy hailing from Hossain Pur, Sirajganj, Bangladesh,(Figure-1) came with the complaints of repeated convulsion from 3rd day of his life. Patient has no neck control, unable to seat, walk and speak. He has also impairment of vision and hearing. Patient is very irritable, cry almost all time, not alert and interested to surroundings. He even not sleeps whole over the night. Clinical history should also focus on screening for co-morbid disorders including epilepsy, musculoskeletal abnormalities, pain, visual and hearing difficulties, feeding problems, communication disorders, and behavioral disorders.The physical exam should focus on identifying clinical signs of cerebral palsy. Head circumference, mental status, muscle tone and strength, posture, reflexes (primitive, postural, and deep tendon reflexes), and gait should be evaluated. Clinical signs and symptoms of cerebral palsy can include microcephaly, excessive irritability or diminished interaction, hyper- or hypotonia, spasticity, dystonia, muscle weakness, a persistence of primitive reflexes, abnormal or absent postural reflexes, incoordination, and hyperreflexia.In our patient present with repeated convulsion for third day of his age till before operation. No neck control, unable to sit and walking. Impairment of vision, unable to speak, no interaction with others and not responding to his mother's call even. Patient was very irritable and no sleeps almost every day and night. He was treated by several pediatricians without improvement rather deteriorating day by day. Regarding birth history: baby did not cry for 20 minutes Feeding history; Baby only take infant formula since his birth. He has gross developmental delay. On Examination: patient is not alert, not interested to the surroundings. Vital signs are within normal limit. He was moderately wasted and mildly stunted. Microcephaly is present. Patient did not fix and follow the object. Tone is increased in all four limbs. Palmar and planter grasp is present.CT scan findings of the patient is; skull diameter is small; contour or shape is shaved. In some cases, bifrontal diameter decreased. Areas of infarction in brain. Brain atrophy also there. (Figure-2)

**Figure 1:** Appearance of the patient before operation.

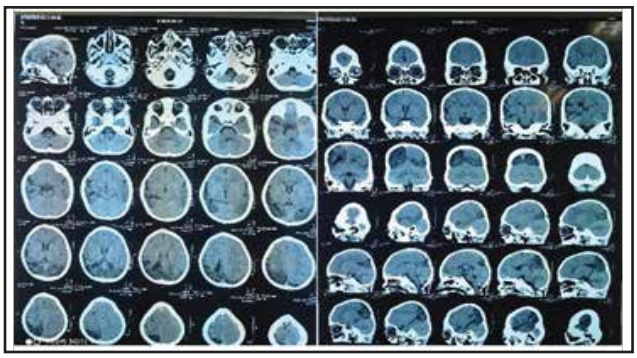

**Figure 2:** Preoperative CT scan Picture of This CP patient.

Invented surgical approach for this patient: Bilateral Cranioplasty, drilling and removal of skull base hyperostosis bone, removal of thickened temporal bone was done.

**Figure 3**: Patient appearance after operation.

Post operatively patients behave excellent (Figure-3). After 10 days of operation patient is taking rice with vegetable by mouth. This is the first time for his life. Convulsion has stopped though anticonvulsant drug are continuing. Before operation also was getting anticonvulsive, but convulsion was continuing. Now patient sleeping normal. Previously patient was lethargic. Now energetic patient is able to see. Patient is now able to communicate with his mother and grandmother. 4thpost-operative day CT scan showed infracted area of brain decreasing (Figure-4). From 4th post-operative day patient was able to raise head stably.

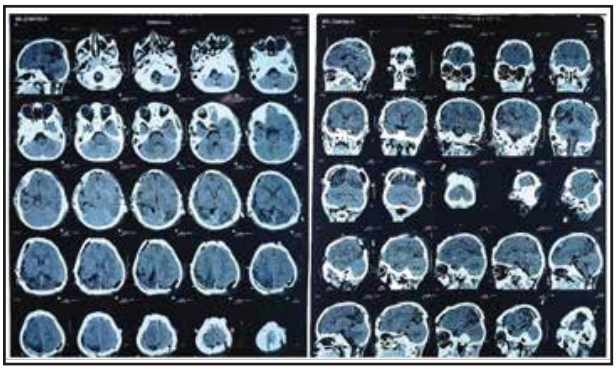

**Figure 4**: Postoperative CT scan picture of this CP patient.

On 27th day of operation patient was able to walk with one hand support. Patient now smiling with his grandmother.(Figure-5)

**Figure 5:** On 9thpost-operative day patient enjoying video games on 27th day of operation patient is able to walk with his grandmother.

## Discussion

Usual treatment of cerebral palsy takes a interprofessional team approach. The team includes physicians (primary care, neurologists, physiatrists, orthopedists, and other specialists needed based on co-existing conditions), therapists (physical, occupational, and speech), behavioral health specialists, social workers/case managers, and educational specialists. Interventions should focus on maximizing the quality of life and decreasing disability burden. The patient, family, and team should set functional goals that are realistic and periodically reevaluated.[7] Oral and injectable (e.g., botulinum toxin) medications are used to treat tone abnormalities, pain, and comorbid conditions such as epilepsy, sialorrhea, gastrointestinal disturbances, and behavior disorders. Medications used for spasticity include benzodiazepines, baclofen, dantrolene, tizanidine, cyclobenzaprine, botulinum toxin, and phenol.[8] Dystonia is often treated with trihexyphenidyl, gabapentin, carbidopa-levodopa, and benztropine. Sialorrhea is treated with glycopyrrolate, atropine drops, and scopolamine patches. Anti-seizure medications are used in patients with epilepsy. Constipation is a frequent complication of cerebral palsy and is treated with stool softeners and pro-motility agents. Anti-inflammatories are used for pain and antidepressants for depression and anxiety. Surgical management options include placement of a baclofen pump, selective dorsal rhizotomy,[9] tendon releases, hip derogation/rotation surgery, spinal fusion, strabismus repair, and deep brain stimulation.[8] Most children with cerebral palsy will survive into adulthood.[10] Life expectancy is reduced in those who are severely affected. The most common cause of early death is respiratory disease, usually aspiration pneumonia. The prognosis of motor abilities depends on the cerebral palsy subtype, the rate of motor development, ascertainment of developmental reflexes, and cognitive abilities. Children who walk independently typically achieve this milestone by 3 years of age. Those who walk with support may take up to age 9 years to reach this milestone.[11] A child that is not walking by age 9 years is unlikely to walk even with support. Children with hemiplegic, choreoathetoid, and ataxic cerebral palsy are likely to achieve walking. Good prognostic indicators for independent walking are sitting by age 24 months and crawling by 30 months.[11] Poor prognostic indicators for walking include no having achieved head balance by 20 months, primitive reflexes retained or nor postural reflexes by age 24 months, and not crawling by age 5 years.[11]

In this case we did bilateral cranioplasty. After recovery from anesthesia patient looks like a normal baby. From 4thpost-operative day patient able to raise head stably. On 5th day after operation CT scan showed infarcted area decreasing. Though there was fluid collection. On 10th day after operation patient enjoying video games on android mobile screen. On 27th day after operation patient was able to walking with support with his grandmother. Very much interesting fact that patient was totally seizure free post operatively. Patient gained vision completely. So, Prognosis with early cranial surgery is excellent. Patient able to lead life without support and no need of rehabilitation.

## Conclusion

Others in treatment options are not curative but only rehabilitation for some times.As life threatning complication was convulsion which subsides after operation.Patient was always busy with feeling discomfort with his eyes which was expressed by rubbing his eyes by his hands all time. Patient was always sleeplessly crying and rest less. all these major symptoms subsides just after operation. This early result lead us to conclude that bilateral cranioplasty realy a curable method for Cerebral palsy patients. Others is treatment options are not curative.

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