

# Depressed skull fracture in Ping Pong: elevation with Medeva extractor

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## Abstract

**Introduction** The bones of the skull of the newborn and nursing infants, in general, possess great malleability. For this reason, the depressed fractures occurring at this age are called “Ping Pong” or “Green Stick” fractures. The treatment of these fractures is surgical according to different authors, although some of these fractures that happen in childbirth can elevate themselves spontaneously.

**Technique** A breast milk extractor trade mark “MEDEVA” was used for the procedure in newborns with a depression larger than 2 cm in diameter. Minimal aspiration was performed while observing the elevation through the transparent breast milk extractor MEDEVA until the depression elevated without leaving any trace.

**Discussion** The aspiration procedure was satisfactory and curative in the five children treated. The fracture was successfully elevated and the skull returned to its normal

position and configuration without complications for the patients.

**Conclusion** Finally, it has been demonstrated that this procedure is simple, inexpensive, and avoids surgical intervention.

**Keywords** Depressed skull fracture · Newborns · Fractures in Ping Pong

## Introduction

Depressed fractures of the cranial vault in children under 1 year of age are different from those that occur in older children and adults. This difference is due to the relative plasticity of the infantile skull, which is not completely ossified.

The bones of the skull of the newborn and nursing infants, in general, possess great malleability. For this reason, the depressed fractures occurring at this age are called “Ping Pong” or “Green Stick” fractures. These terms describe nothing more than the conversion of the normal convex surface of the cranium to a concave one secondary to trauma. It is possible for these fractures to lacerate the underlying brain.

Congenital depressions of the skull have an incidence of 1/10,000 births. These are reported to be caused by the pressure of the fingers or wrists of the neonate over the surface of the cranium in-uterus. The diagnosis is always made in the postpartum period.

Acquired depressed skull fractures are generally related to obstetrical maneuvers during difficult deliveries. These depressions in the patient’s skull are produced by two different mechanisms. First, those caused by deformation without fracture and second, those caused by a fracture

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accompanying the depression. The type of fracture that prompted this study is the second.

The treatment of these fractures is controversial. According to different authors, surgical or conservative treatment may be used. It is also suggested that those fractures that occur at the moment of birth may elevate themselves spontaneously shortly after birth [10, 11, 13]. Prompt elevation is necessary because after 72 h the bone becomes more difficult to elevate.

It is the experience of our teachers and our own observations that pressure above the angle of the depression may elevate it. We have performed the manipulation with the fingers seeking the most prominent spot and applying pressure; in some cases, this reduces the fracture. This technique is somewhat difficult and may produce additional trauma to the malleable skull and soft tissues in the newborn.

International studies report successful treatment [6] using obstetrical extractors [1, 5, 12, 15, 16]. But in our center and in our country, the use of this procedure has not been reported.

Until now, with the exception of a few cases where the fracture was elevated by the manual procedure described previously, all the children were taken to the operating room and surgical intervention was performed under general anesthesia.

With the goal of avoiding performing surgical procedures under anesthesia for these fractures and using the experience of others in elevating these fractures by suction, we have developed a method of elevation by suction, which has been effective and low-risk. These suction devices, which are used to extract the milk from those mothers who are unable to nurse the baby directly, are manufactured with constant refinements. One of the recent models is used for this procedure.

## Materials and methods

We applied this procedure in the neurosurgery and neonatology departments of our hospital between the months of September 2003 and February 2005.

This sample consisted of 4 neonates less than 72 h of age and 1 nursing infant of 5 months, 3 females and 2 males. All patients had a traumatic history in the peripartum period except for one delivered by cesarean section. All of the children were of normal weight and full term with normal neurological examinations. During an observation period of 48 h postpartum, the fractures had not elevated spontaneously [17, 18]. The location of the fracture was verified and the scalp was shaved for an area sufficient to supply the vacuum extractor. The shaving and preparation of the scalp is necessary because in the newborn the scalp and hair are

quite oily and it is difficult to attain an adequate seal for the device. Hematological and coagulation studies were performed to confirm normal values. The procedure was explained to the parents and an informed consent was obtained. Cranial ultrasound was performed and brain lesions were not seen beneath the fracture.

The objective of the study was to demonstrate the validity of a procedure that could be performed with minimal risk to the patient by avoiding a surgical intervention under general anesthesia.

## Technique

A breast milk extractor trade mark “MEDEVA” (Fig. 1) was used for the procedure in those children with a depression larger than 2 cm (Fig. 2) in diameter who had a benign clinical course, excellent general and neurological examinations, and had radiographs of the skull (Fig. 3) confirming the fracture and establishing that the fracture was not comminuted, rather a Green Stick fracture due to the immature state of the bone.

In these patients, elevation of the Ping Pong fracture was performed by locating the central part of the extractor over the central part of the fracture and molding the border so that it was airtight (Fig. 1).

Minimal aspiration was performed while observing the elevation through the transparent breast milk extractor MEDEVA until the depression elevated without leaving any trace (Fig. 4). After the procedure, diagnostic ultrasound was performed to assure the absence of intracranial injury produced by the procedure.

The patients were observed in the hospital for the first 24 h and discharged. They were followed-up weekly for 2 weeks and then monthly until 1 year of age. All children had an electroencephalogram (EEG) at 6 months after the



**Fig. 1** A breast milk extractor trade mark “MEDEVA” was used for the procedure



**Fig. 2** Newborn with a depression larger than 2 cm in diameter who had a benign clinical course

procedure. Routine clinical follow-up consisted of general examination, head circumference measurements, and evaluation of psychomotor evaluation until 1 year of age.

### Discussion

The aspiration procedure was satisfactory and curative in the five children treated. The fracture was successfully elevated and the skull returned to its normal position and configuration without complications for the patients.



**Fig. 3** Radiographs of the skull showing the Ping Pong fracture



**Fig. 4** Minimal aspiration was performed while observing the elevation through the transparent breast milk extractor MEDEVA until the depression elevated without leaving any trace

The 18 months follow-up period has been with good progression of psychomotor development and quality of life for the 5 treated patients. There were no complications during the procedure or in the follow-up period for these cases in contradistinction to the international studies, which report diverse complications of the use of obstetrical suction devices [2–4, 7–9, 13, 19]. This procedure avoids infection, the formation of hematomas, and the loss of blood, which are the most common complications of open surgery.

The applied method has demonstrated its safety and accomplished its principal mission, which is to avoid subjecting neonates to a surgical intervention under general anesthesia with the risks of sepsis, bleeding, and hypothermia, and avoiding a residual surgical scar.

We think that the milk extractor MEDEVA is superior to other obstetrical suction devices for the elevation of depressed skull fractures in neonates and nursing infants. This device requires lower pressure, is more easily controlled than other devices, and, furthermore, possesses a transparent seal that permits observation during the procedure of the elevation of the fracture. Because of these factors, it is possible to avoid the complications reported with the use of other devices.

It is our opinion that these fractures should be treated within the first 72 h because the bone becomes more difficult to elevate after this time. We believe that elevation is beneficial.

### Conclusions

Finally, it has been demonstrated that this procedure is simple, inexpensive, and avoids surgical intervention. The

use of this technique reduces the length of hospital stay of these children to at least 24 h and avoids unnecessary cannulation of peripheral veins or umbilical catheterization and the risks that these bring.

The social effect of this procedure in addition to the conservation of resources and the reduction of risks to a minimum prevents familial stress and provides the tranquility necessary for the mother to breast-feed the baby.

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