

**ORIGINAL RESEARCH**

## **Most Common Causes of Cerebral Palsy in Tobruk Medical Center , Libya and Diagnosis by Radiography and Treatment by Physiotherapy**

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**Received:** 21 April 2023

**Accepted:** 24 May 2023

**Published:** 20 June 2023

**ABSTRACT:** Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture. CP is the most common motor disability in childhood. Cerebral means having to do with the brain. Palsy means weakness or problems with using the muscles. CP is caused by abnormal brain development or damage to the developing brain that affects a person's ability to control his or her muscles. The aim of this study to investigate about the most causes that lead to The birth of a child with cerebral palsy, especially births that occurred in Tobruk Medical



Center or private clinics in Tobruk and its suburbs, where it has been widely spread in recent years. In this study, we will learn about the causes of cerebral palsy, its symptoms, the signs that appear on the child, how it is diagnosed and methods of treatment, especially with physical therapy. Medicare Provider Analysis and Review files were used to identify all cases for cerebral palsy in Tobruk, Libya between Apr 2018, Jun2021, where found 61 cases of cerebral palsy 35 male and 26 female that diagnosed by physical examination.

**KEYWORDS:** Cerebral Palsy, Rehabilitation Radiography, Cases in Tobruk Medical Center, Libya, Physical Therapy.

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## INTRODUCTION

The presentation of cerebral palsy can be global mental and physical dysfunction or isolated disturbances in gait, cognition, growth, or sensation. It is the most common childhood physical disability and affects 2 to 2.5 children per 1,000 born in the United States. The differential diagnosis of cerebral palsy includes metabolic and genetic disorders (Kriger, 2006).

Cerebral palsy can result from brain injury occurring during the prenatal, perinatal, or postnatal periods.<sup>1,2</sup> Seventy to 80 percent of cerebral palsy cases are acquired prenatally and from largely unknown causes. Birth complications, including asphyxia, are currently estimated to account for about 6 percent of patients with congenital cerebral palsy.<sup>3</sup> Neonatal risk factors for cerebral palsy include birth after fewer than 32 weeks' gestation, birth weight of less than 5 lb, 8 oz (2,500 g), intrauterine growth retardation, intracranial hemorrhage, and trauma. In about 10 to 20 percent of patients, cerebral palsy is acquired postnatally, mainly because of brain damage from bacterial meningitis, viral encephalitis, hyperbilirubinemia, motor vehicle collisions, falls, or child abuse (Kriger, 2006).

Cerebral palsy is the commonest physical disability in childhood yet in many cases the cause remains unknown. The term "cerebral palsy" describes a group of disorders of movement and posture due to a defect or lesion of the immature brain Cerebral palsy is

a symptom complex, with various types and degrees of motor impairment. These disorders become manifest early in life and are permanent and non-progressive conditions Known causes of cerebral palsy It is helpful to classify the known causes according to the timing of the brain insult whether prenatal, perinatal or postnatal.

Signs and symptoms of cerebral palsy can vary greatly from person to person. Cerebral palsy can affect the whole body, or it might be limited primarily to one or two limbs, or one side of the body. Generally, signs and symptoms include problems with movement and coordination, speech and eating, development, and other problems (Novak, et al. 2020).

Diagnosis of cerebral palsy by radiology, and one of the most important radiological examination devices for assessing brain damage or brain atrophy is magnetic resonance imaging.

An MRI can help medical professionals detect evidence of brain injuries that can cause Cerebral Palsy. However, it is possible to have a completely normal MRI and to still have Cerebral Palsy (Cushing, 1985). With this in mind, medical professionals often rely on a a more comprehensive approach to diagnosing Cerebral Palsy. MRI was useful in detecting underlying brain abnormalities, most of which were due to events in the third trimester or perinatal period In the single-term birth series (Dunn, 1995).

The goals of treatment are to improve functionality and capabilities toward independence. Multispecialty treatment teams should be developed around the needs of each patient to provide continuously updated global treatment care plans. Complications of

cerebral palsy include spasticity and contractures; feeding difficulties; drooling; communication difficulties; osteopenia; osteoporosis; fractures; pain; and functional gastrointestinal abnormalities contributing to bowel obstruction, vomiting, and constipation. Valid and reliable assessment tools to establish baseline functions and monitor developmental gains have contributed to an increasing body of evidenced-based recommendations for cerebral palsy (Kriger, 2006).

**Passive Stretching:** It is a manual application for spastic muscles to relieve soft tissue tightness. Manual stretching may increase range of movements, reduce spasticity, or improve walking efficiency in children with spasticity (Anttila, H. 2008) (Souliman, et al, 2019 ).

Weight bearing has been reported to reduce contracture in the lower limb through use of Tilt-tables, and standing frames through a prolonged stretch. Angles are key to ensure the knees remain extend during the prolonged stretch as the force exerted on the knee can be quite high. Some research also challenges the assumption of the benefits of prolonged standing.

**Splints and casts** are external devices : designed to apply, distribute or remove forces to or from the body in a controlled manner to perform one or both basic functions of control of body motion and alteration or prevention in the shape of body tissue.

**Muscle Strengthening Exercises:** It aims to increase the power of weak antagonist muscles and of the corresponding spastic agonists and to provide the functional benefits of strengthening in children with CP. (Anttila, H. 2008) (Souliman, S. I., et al. 2022).

**Electrical Stimulation:** The goal of the electrical stimulation is to increase muscle strength and motor function. Electrical stimulation is provided by Transcutaneous Electrical Nerve Stimulation (TENS)

Need to identify more ways to help their patients incorporate “activity, activity, activity” into their lifestyles. The promotion of activity is not in conflict with ecological approaches, because activity can and should occur in natural, everyday settings whenever possible. However, for people with greater physical challenges or for more intense

conditioning or training, exercise equipment or computerized devices may need to be utilized (Damiano, D. L. 2006).

legislatively mandated programs for early intervention on behalf of handicapped infants often stipulate the inclusion of physical therapy as a major component of treatment for cerebral palsy. To evaluate the effects of physical therapy, (Palmer et al, 1988).

The aim of this study to investigate about the most causes that lead to The birth of a child with cerebral palsy, especially births that occurred in Tobruk Medical Center or private clinics in Tobruk and its suburbs, where it has been widely spread in recent years

### MATERIALS AND METHODS

Medicare Provider Analysis and Review files were used to identify all cases for cerebral palsy in medical Tobruk Centre and almalak clinic Tobruk, Libya between Apr 2018, Jun2021, where found 61 cases of cerebral palsy 35 male and 26 female that diagnosed by physical examination As shown in Table 1.

**Table (1)** Cerebral Palsy Patients.

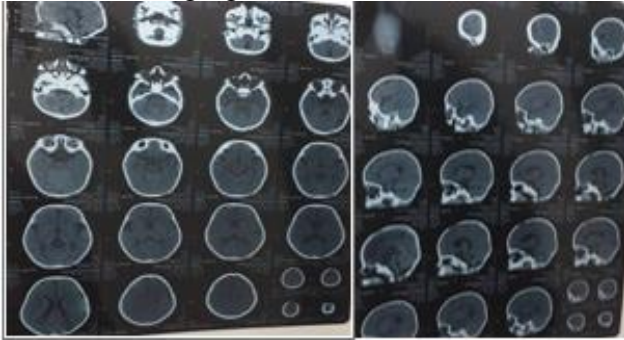
| Years | Patients  | Death    |
|-------|-----------|----------|
| 2018  | Male 5    | Male 2   |
|       | Female 3  | Female 2 |
| 2019  | Male 10   |          |
|       | Female 7  |          |
| 2020  | Male 18   |          |
|       | Female 14 |          |
| 2021  | Male 2    |          |
|       | Female 2  |          |
| Total | 61        |          |

\*Causes of death : Anemia, short breathing, cough, fever, dyspnea, atrophy, heart failure, brain atrophy.

### *Most Common Causes*

Hypoxia, problems during labor, complication of meningitis, complication of hyperthermia, tachycardia during pregnant and rare genetic syndromes.

**Diagnosis** by clinical assessment and radiography as shown fig 1 by use Magnetic resonance imaging (MRI).



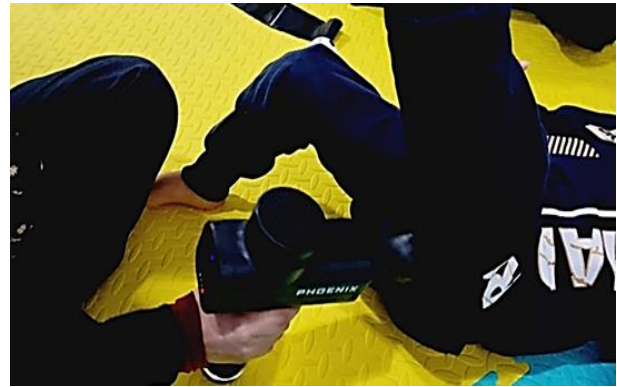
**Figure: (1).** Figure 1 MRI 2 children with Cerebral palsy due to genetic diseases.

### **Physical Therapy**

Physiotherapy in the early age is very important, and the sooner we start treatment, the greater the chances of a response.

Physical therapy for cerebral palsy patients depends on sensory and motor stimulation.

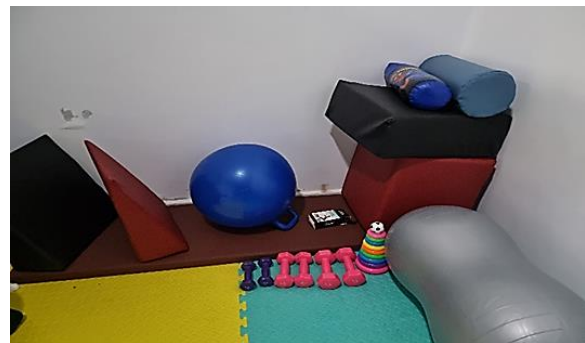
- Sensory stimulation by stimulating sensory receptors in the upper and lower extremities through massage, passive active movement these movements may help to preserve the memory of movement patterns by stimulating the receptors of kinesthetic sense, and electrical stimulation for cases that do not suffer from convulsions or epilepsy.
- Motor stimulation Use thermal devices and massage to relax the muscles. The Thera gun can also be used as fig 1, and sometimes doctors recommend some medications to relieve muscle spasms.



**Figure: (2).** Theragun for CP

.Theragun (phenox) is massage therapy to treat muscle soreness, relieve pain and increase blood circulation If the patient is unable to perform the movement himself can use passive movement, or the active movement is performed by the child himself.

Using exercise therapy equipment as fig 2 to strengthen the neck muscles as fig 3, strengthen the trunk muscles, and teach the child to sit as fig 4, and use Swiss ball to balance and muscles strengthen as in the fig 5



**Figure: (3).** exercise therapy equipment.



**Figure: (4).** Strength Neck Muscles.

Neck muscles strengthening by use thera band that give resistance force for the patient or can

use wedge pillow by move the head to up and down.



**Figure: (5).** Strength Trunk Muscles.

Learn the child to sitting by use wedge pillow and to strength muscles of trunk. Strengthen muscles of the upper limbs by using weights as shown in the fig 5. also use special weights for the legs that can wearing by child.



**Figure: (6).** weight bearing.

braces and splints for upper and lower extremities deformities and also help the child in balance and walk properly, also use standing equipment to stand training as fig 7.



**Figure: (7).** Standing Training.

Gait training by use parallel bar when patient can not stand or need to assist can use parallel

bar or assist by physiotherapist or use the walker and crutches as fig 8.



**Figure: (8).** parallel bar.

Parallel bar very important for gait training, postural training, trunk control training, balance training with and without support, strengthening and mobility management of lower limb

### **Data Analysis**

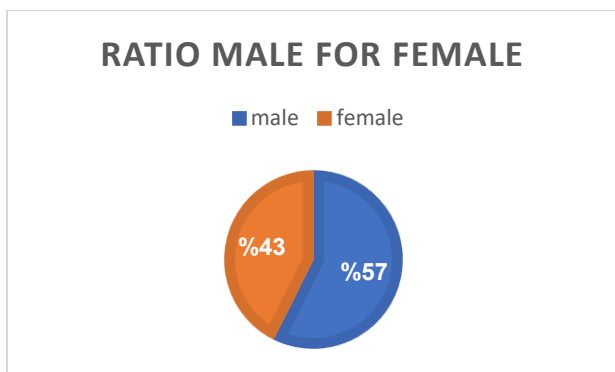
The data were analyzed by using IBM SPSS Statistics 23 and Excel 360 Microsoft office.

## **RESULTS AND DISCUSSION**

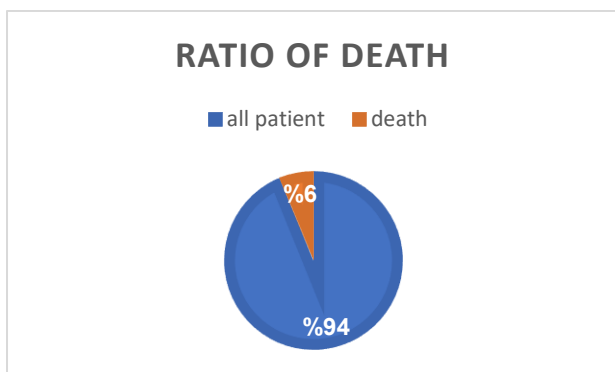
The aim of this study to investigate about the causes that lead cerebral palsy in Tobruk between Apr 2018, Jun2021 where found 61 cases 35 male and 26 female as shown in figure 8.

Radiological diagnosis of positive MRI (Magnetic resonance imaging), scans in other series. For parents looking for a cause for their child's disability, radiological diagnosis is now possible in the majority of cases.

However, this radiological diagnosis may not necessarily provide information as to the cause of the brain lesion. Important clues to the timing of a brain lesion can be provided.

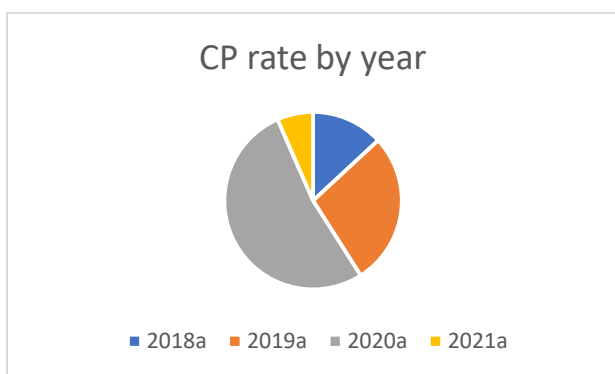


**Figure (8).** Ratio of Males and Females. 61 patients have recorded in this study with cerebral palsy where were the male more than female.



**Figure (9).** Ratio of Death. 4 deaths were recorded, including 2 girls and 2 boys, out of a total of 61 cases.

In 2020, the highest incidence of cerebral palsy was observed as shown in figure 10. And 2021 the lowest.



**Figure (10).** Cerebral Palsy Rate by Year. Physiotherapy is very important in early where the cases that had physiotherapy in first improvement better than in late age

The physical therapy plays important role to

recovered or enhance of ability the patients in daily activity

Physiotherapy program should involve motor and sensory stimulation to give the best result and development.

Physiotherapy at Tobruk played an important role for patients to recover and return to normal life in the least time, physiotherapists followed patients until full recovery by providing them with advice and following up on the rehabilitation program.

Patients and his family were satisfied with the physical therapy and confirmed that they are more comfortable after the physiotherapy and improve patient normal daily routine better than before.

If the patient stops physical therapy before improvement all function of muscles and joint that lead to go back in health and return to first point.

(Palmer, F. B., et al, 1988). legislatively mandated programs for early intervention on behalf of handicapped infants often stipulate the inclusion of physical therapy as a major component of treatment for cerebral palsy (Palmer, F. B., et al, 1988). This agreed with our study where motor and sensory is should be involved programmed in early age.

Damiano, D. L. (2006) Need to identify more ways to help their patients incorporate “activity, activity, activity” into their lifestyles. The promotion of activity is not in conflict with ecological approaches, because activity can and should occur in natural, everyday settings whenever possible. However, for people with greater physical challenges or for more intense conditioning or training, exercise equipment or computerized devices may need to be utilized (Damiano, D. L. 2006). Agreed with this study where physical therapy is very important.

Reddihough, D. S., & Collins, K. J. (2003). conducted studies most common causes of cerebral palsy are Problems during labor and delivery Obstetric emergencies such as

obstructed labour, antepartum hemorrhage or cord prolapse may compromise the fetus causing hypoxia, infections (rubella, cytomegalovirus, toxoplasmosis). Less common causes of cerebral palsy include metabolic disorders, maternal ingestion of toxins and rare genetic syndromes (Readthrough, D. S., & Collins, K. J., 2003). Agree with study

### CONCLUSION

We conclude from our study on cerebral palsy at Tobruk that most causes is lack oxygen, head trauma, prolonged and difficult pregnancy

Through this study, we recommend the pregnant maintaining proper nutrition and should follow up during pregnancy and take advice his doctor and if had baby with cp should start with physiotherapy in early age

Physiotherapy played an important role in recovering patients in a short time and improve ability to do daily activities, should do motor and sensory stimulation to give better result, further studies are required to confirm these findings.

Computed tomography plays a very important role in the diagnosis of brain radiography MRI of the brain too.

### ACKNOWLEDGEMENT

We would like to thank everyone help in performing this work,. We also thank staffs in Tobruk University and Tobruk medical Centre.

### ETHICS

This manuscript has ethical permission from

the University of Tobruk.

### REFERENCES

- Anttila, H. (2008). Evidence-based perspective on CP rehabilitation: Reviews on physiotherapy, physiotherapy-related motor-based interventions and orthotic devices..
- Hefley, T. J., K. M. Broms, B. M. Brost, F. E. Buderman, S. L. Kay, H. R. Scharf, J. R. Tipton, P. J. Williams, and M. B. Hooten. In press. The basis function approach for modeling autocorrelation in ecological data. ArXiv:1606.05658.
- Dunn, P. M. (1995). Dr William Little (1810-1894) of London and cerebral palsy. Archives of disease in childhood. Fetal and neonatal edition, 72(3), F209.
- Damiano, D. L. (2006). Activity, activity, activity: rethinking our physical therapy approach to cerebral palsy. Physical therapy, 86(11), 1534-1540.
- Krigger, K. W. (2006). Cerebral palsy: an overview. American family physician, 73(1), 91-100.
- Cushing, A. H. (1985). Omphalitis: a review. The Pediatric Infectious Disease Journal, 4(3), 282-285.
- Palmer, F. B., Shapiro, B. K., Wachtel, R. C., Allen, M. C., Hiller, J. E., Harryman, S. E., ... & Capute, A. J. (1988). The effects of physical therapy on cerebral palsy. New England Journal of Medicine, 318(13), 803-808.
- Reddihough, D. S., & Collins, K. J. (2003). The epidemiology and causes of

cerebral palsy. *Australian Journal of physiotherapy*, 49(1), 7-12.

يونيو 2021، حيث تم رصد 61 حالة شلل دماغي (35 حالة لذكور و26 حالة لإناث) تم تشخيصها بالفحص السريري.

Souliman, S. I., Souliman, A. A., & Salemn, A. Diagnosis and Rehabilitation Clavicle Fracture by Radiography and Physiotherapy. *Tobruk University Journal For Medical Sciences (TUJMS)*, 53.

**الكلمات المفتاحية:** الشلل الدماغي، إعادة التأهيل، التصوير الشعاعي، حالات في مركز طبيرق الطبي، ليبيا، العلاج الطبيعي.

Souliman<sup>1</sup>, S., Suliman, A., Suliman, A., Ahameed, Z., & Omer, D. (2019). *Tobruk University Journal of Medicine Science. Tobruk University Journal Of Medical Sciences*, 70.

Novak, I., Morgan, C., Fahey, M., Finch-Edmondson, M., Galea, C., Hines, A., ... & Badawi, N. (2020). State of the evidence traffic lights 2019: systematic review of interventions for preventing and treating children with cerebral palsy. *Current neurology and neuroscience reports*, 20(2), 1-21.

## المخلص

الشلل الدماغي هو مجموعة من الاضطرابات التي تؤثر على قدرة الشخص على الحركة والحفاظ على التوازن والوضعية. يُعدّ الشلل الدماغي أكثر الإعاقات الحركية شيوعًا في مرحلة الطفولة. يشير مصطلح "دماغي" إلى ما يتعلق بالدماغ، بينما يشير مصطلح "شلل" إلى ضعف أو مشاكل في استخدام العضلات. ينجم الشلل الدماغي عن خلل في نمو الدماغ أو تلف في الدماغ النامي، مما يؤثر على قدرة الشخص على التحكم في عضلاته. تهدف هذه الدراسة إلى البحث في أهم الأسباب المؤدية إلى ولادة طفل مصاب بالشلل الدماغي، وخاصةً الولادات التي حدثت في مركز طبيرق الطبي أو العيادات الخاصة في طبيرق وضواحيها، حيث انتشر المرض على نطاق واسع في السنوات الأخيرة. سنتعرف في هذه الدراسة على أسباب الشلل الدماغي، وأعراضه، والعلامات التي تظهر على الطفل، وكيفية تشخيصه، وطرق علاجه، وخاصةً العلاج الطبيعي. استُخدمت ملفات تحليل ومراجعة مقدمي خدمات الرعاية الصحية ( Medicare Provider Analysis and Review ) لتحديد جميع حالات الشلل الدماغي في طبيرق، ليبيا، خلال الفترة من أبريل 2018 إلى

