

## Cerebral Palsy

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### **Efficiency of laser therapy applied in labial traumatism of patients with spastic cerebral palsy.**

[Moreira LA](#), [Santos MT](#), [Campos VF](#), [Genovese WJ](#).

Laser Disciplines in Dentistry, Implantodontics and Integrated Dentistry Clinic, University of Cruzeiro do Sul (UNICSUL), Sao Paulo, SP, Brazil. lam@apcd.org.br

The aim of this study was to report the effectiveness of laser therapy applied to traumatic labial injury of patients with spastic cerebral palsy. We report two cases of patients with internal mucosa and lower lip traumatism caused by oral reflex automatism with spastic tonic bite and lower lip interposition. One patient presented extensive lower lip ulceration, loss of tissue, crusty and hemorrhagic areas, with increasing pain and spasticity. The other patient presented local congestion signs, extremely enlarged tissue growth and increased labial volume. Laser therapy was applied to all injured areas, with a low-potency diode InGaAlP laser [685 nm Quasar (Dentoflex), 190 J/ cm<sup>2</sup>, with a 24-h interval between the first and second administration, and a 7-day interval between the two subsequent ones. At first re-evaluation, 24 h later, there was a striking reduction in inflammation, a decrease in vascular congestion, and a reduction of the ulcerated area with spasticity and pain reduction. At the 14-day re-evaluation, significant clinical differences in the advanced healing process were seen. Low-intensity laser showed to be effective in traumatic soft tissue treatment in cerebral palsy patients by accelerating the healing process, reducing secondary contamination, promoting analgesia; thus, it can be an important tool in the treatment of these patients.

Proc. 2nd Congress World Assn for Laser Therapy, Kansas City, September 1998; p. 99-100.

### **Application of low reactive-level laser therapy (LLLT) in the functional training of cerebral palsy patients.**

**Asagai Y et al.**

Asagai reports on the use of GaAlAs (100 mW) laser treatment in a group of 1000 patients with cerebral palsy. The laser reduces muscle spasm and increases the mobility

of the muscles. Although the duration of the LLLT effect was limited to one to several hours, it can be applied in conjunction with conventional functional therapies, thereby enhancing the effects of the latter.

## **Application of Laser Acupuncture in Children with Cerebral Palsy**

by *Majid Fadaie MBBS (Pb), Lic AC (China), Medical Acupuncturist*

([majidfadaie51@hotmail.com](mailto:majidfadaie51@hotmail.com))

*in collaboration with*

**Malik Mohammad Nadeem Khan, MBBS, MS,**

Pediatric Neurosurgeon & Assistant Professor, Childrens' Hospital & Institute of Child Health, Lahore

**Suriyya Yasameen Shah MBBS (Pb), DPM&N (KSU),** Director of Amin Maktab and

**Raufa Fathi MBBS, Dip Ac,** Medical Acupuncturist

### **Abstract**

To evaluate the effect of acupuncture (AP) in children brain-damaged from various causes, a 7-month study was conducted from 13.9.2001 to 13.4.2002. In all, 29 children were treated and their clinical responses were evaluated. These children were classified according to other major complaints, like cortical blindness or deafness or autistic disorders. Of 10 children with cortical blindness, 4 (40%) recovered completely from blindness; of 5 children with impaired hearing or deafness, 5 (100%) improved. Children with brain damage and autistic disorders improved to a minor degree only. Two children with accidental brain damage improved to a very minor degree. Of 16 children with spastic disorder, 12 (75%) improved. Children with epilepsy and those >5 years old had comparatively poor results

### **Introduction**

Much research has been conducted in the last two decades on the efficacy of AP treatment of various ailments. Though these studies are still in their infancy, a great deal of information has been gained. These studies have led to the emergence of medical AP, a science that studies AP from a medical perspective

In 1971, Jiao Shunfa from China developed a new science called **Scalp AP** (1), which is based on the physiological function of different brain areas, as studied in conventional medicine. In this AP method, different scalp zones were stimulated with needles in order to stimulate the reflexly-related nervous tissue. For better localization of the Scalp Points in relation to underlying cerebral tissue two cadavers were subjected to dissection and the proportions and relations were determined. On the basis of these studies it was possible to localize scalp zones that related to specific parts of the brain. EEG measurements in patients undergoing Scalp AP allowed changes before and after AP to be recorded. It was confirmed that stimulating the overlying scalp tissue can stimulate the underlying brain tissue.

The World health organization (**WHO**) reviewed and standardized Scalp AP at a meeting on Standardization of AP Nomenclatures, Tokyo, May 1984. In 1988, WHO published the first standard pamphlet on Scalp AP (2).

Studies have shown that Scalp AP and body AP to be very effective in children with paralysis (3). Research in Scalp AP has shown that this method increases cerebral blood flow. (4)

**Laser AP** is the stimulation of selected AP points with a low level laser (soft laser). In this method of therapy, AP points are exposed to laser radiation for 10-25 seconds, and the whole treatment may take only 5 minutes to complete. Its main application is in AP of children, because it is pain free and 100% aseptic (5).

In spite of improved medical care, the number of brain-damaged children is increasing. The prevalence is about 500 cases/100,000 population (6). Once a child suffers from brain damage, we have very little to offer the families. The incidence of CP children is about 7/1000 live births. (6) Accidental brain damage is increasing this figure. According to a survey conducted in Islamabad (1986), 2.6 % of the population of Pakistan is disabled. Children between 0-14 constitute 40% of the disabled.

Laser AP may prove to be of value in reducing disability. This study has proven that this modality can greatly improve the health of cerebral palsy (CP) children and reduce their disabilities.

### **Material and methods**

This is a prospective study conducted at the AP Clinic in Fazal Hospital and Heart Center, Lahore, from September 2001 to April 2002 and Amin Maktab, Fardos Market Lahore. Amin Maktab is a center for mentally retarded children and CP. A total of 29 children with brain damage of various causes were treated. Their ages ranged from 5 months to 11 years old; 17 were boys and 12 were girls; the male:female sex ratio was 1.4:1.

The history of all children was taken and a primary clinical assessment was done. CT scan and MRI were conducted to rule out surgical lesions in some cases. After primary assessment, the children were treated with laser AP at the relevant Scalp Zones. Their day-to-day progress report was recorded. A photograph of each child with physical dysfunction was taken before and after treatment. Families were requested to bring the children for treatment 3 times/week initially, then twice/week as improvement was observed, and once/week after about one month.

#### **Age distribution:**

<b>Age</b>	<b>Number of children</b>
</=2 years old	15
2 -5 years old	7
5-10 years old	6
11 years old	1
Total	29

#### **Relation of age to response to the treatment:**

<b>Age</b>	<b>Response of children in relation to age</b>
<=2 years old	Very good
2 -5 years old	Good
5-10 years old	Poor
11 years old	Very poor

**Etiology of brain damage:** Of 29 brain-damaged children, 23 (79.3%) had prenatal or perinatal brain damage of various causes (birth asphyxia, jaundice, meningitis and encephalitis), 4 (13.8%) had genetic brain anomalies and 2 (6.9%) had brain damage due to a road-accident.

**Response of children with brain damage and cortical blindness or other eye abnormality:** Of 29 children, 10 had cortical blindness or other eye abnormalities. Of those 10 children, 4 (40%) recovered after Laser-AP at the relevant Scalp Zones; another 4 children (40%) showed improvement, as assessed by either pupillary light reaction or reduced eye rolling or nystagmus; 2/10 (20%) showed no response to treatment. Thus the effective rate (recovery + definite improvement) to Laser-AP was 80%.

**Response of children with brain damage and impaired hearing (deafness):** Of 29 children, 4 were diagnosed by audiometry as having impaired hearing, or the parents had noticed that child does not respond to their calls; 4/4 (100%) improved after treatment, as confirmed by audiometry or their response to being called. These children either were pre-diagnosed cases of hearing impairments, or the parents had noticed that the child did not respond to external calls. There may have been more children with impaired hearing in our study group that were not diagnosed as deaf but which may have had mild hearing impairments.

**Response of children with brain damage and spasticity:** Of 29 children, 16 had spastic disorders. Of those, 6/16 (37.5%) recovered from fully from muscular spasticity or rigidity; a further 6/16 (37.5%) had mild to moderate improvement. Only 4/16 (25%) did not improve.

**Response of children with brain damage and muscle flaccidity or normal musculature:** Of 29 children, 6 had muscle flaccidity or apparently normal musculature; of these, all 6 (100%) improved their muscle function.

**Response of children with brain damage and genetic brain disorder:** Of 29 children, 4 had congenital cerebral atrophy and 3 of the 4 belonged to the same family. Only 1/4 (25%) improved; the failure rate was 75%.

**Response of children with brain damage and speech disorder:** Of 29 children with aphasia or impaired speech, 7 (24.4%) showed improvement in their speech to a mild to moderate degree (making few more words or small sentences) and 1 (3.4%) child showed great improvement and was able to make good sentences. 21 (72%) children showed little improvement in their speech but started making voices and tried to talk. They became more expressive.

**Children with brain damage and epilepsy:** Of 29 children, 4 had epileptic fits also. The results in these children were very poor, though vision was restored in one of them and muscle spasticity was greatly reduced in another. In general, however, we found that epileptic children cannot tolerate Laser-AP, which increased the frequency of their fits. The child's brain grows rapidly during at the first 2-3 years of life and if any part of the brain can be salvaged it should be salvaged. This is because no restoration may be possible if one loses this valuable period of brain growth in early life. After that, the child will be condemned to live a vegetative life. Therefore, it is advisable to keep the child on antiepileptic medication and treat these children with Laser-AP but with longer inter-session intervals. Also, the families should be informed of possible consequences.

**Children with brain damage and autism:** Of 29 children, 2 had autism. Though they improved in other areas of mental faculties, their autism improved little.

**Side effects of Laser-AP on the Scalp Zones:** The following side effects occurred. All were manageable and need not worry parents or consultants. However, is very important to inform families and consultants of these side effects before treatment begins.

1. **Increase in epileptic fits:** Stimulation of cerebral cortex via the Scalp Zones clearly increased the frequency of fits in children. This side effect could be managed easily by administration of antiepileptic medication, or by increasing the inter-session interval.

2. **Loss of appetite** was seen in few cases after long treatments. This side effect could be managed easily by changing the treatment for some time.

3. **Hyperactivity:** Some children became hyperactive, probably due to increased cerebral stimulation. Hyperactivity usually could be decreased by decreasing the frequency of treatment. However, families usually were happy to see the child more active.

4. **Irritability:** Irritability occurred in very few cases, especially in older children. This side effect could be managed by changing of pattern of treatment or by increasing the inter-session interval.

**Relapse reactions:** Factors that caused relapse included:

1. **Respiratory infection:** Certain children relapsed after upper respiratory infection. This could be due to the accompanying cough in such infections causing temporary increases in intracranial pressure. These children recovered fast after the infection disappeared.
2. **Epileptic fits:** Children with fits had a higher percentage of relapse. This could be due to increased frequency of fits and increased intracranial pressure.
3. **Intestinal infection:** Intestinal infection caused relapses to a very negligible level.
4. **Shunt obstruction:** This occurred only in one case; the condition of the child relapsed after shunt obstruction. As soon as the shunt was corrected the child improved.

## **Discussion**

Studies from different parts of the world have claimed successful results in treating different complications of brain damage. Liang (9), reported 100% cure rate in **cortical blindness** in children in China. However, the cure rate in our study was only 40%. Liang's high success may be due to the fact that he did excluded accidental cortical blindness in his studies. Also, Liang used needle-AP, whereas we used laser-AP only.

An effective rate of 91% and cure rate of 25% in 48 children with **deaf-mutism** was reported by the Jiangxi TCM Institute (10). The effective rate in our study was 100% but we would need to treat many more children to confirm that result.

Dr. Petra Fila (Switzerland) treated 23 cerebral palsy children, mainly 6-7 years of age (11). In her study, three children began to walk either with assistance or alone, three more progressed to near walking levels. Other children had great improvements in kneeling, sitting, muscle tone and the degree of spasm. The article concluded that AP might be a good adjuvant therapy in these children. In our study we found that spasticity can be managed easily; 6 children recovered fully, 6 improved greatly and 4 did not respond. This gave an effective rate of 75%. In hypotonic paralysis the effective rate was almost 100%. This difference could be due the fact that we chose younger children.

Understanding the brain and brain plasticity (12) can give us the chance to revive most parts of the damaged tissue and it can clearly show us the best time to start the treatment of these children. In our treatment protocols we selected the points that have been proven by AP research to increase cerebral circulation (4, 8). I believe selection of these points increased the speed of recovery.

Review of the above data, and of data from other doctors around the world, suggests that needle- or Low Power Laser- stimulation of the relevant Scalp AP Zones can improve greatly the general condition in CP children. In our study, Laser-AP was safe, effective, painless and aseptic; it gave rapid results in amenable cases. Most children complied easily with the treatment. Changes were observable almost in the first week of therapy. This may be a good adjuvant therapy to help these children to reduce the degree of their disabilities. Proper selection of the cases and conduction of the treatment at the proper time should optimise the success rate. The best results were in children <2 years of age and the second best group were <5 years of age. Children with epilepsy either should be excluded, or treated only under pediatric supervision, and with longer inter-session intervals.

### **Conclusions**

- Our study clearly illustrated the efficacy of laser AP in brain-damaged children. Its magnitude of benefit was far from the possible side effects.
- Cortically blind and deaf children benefited maximally from this treatment.
- Children with spasticity and flaccidity are good indications for laser AP.
- Children <5 years old were the best target group.
- Children >5 years old may receive only minimal benefit from this treatment.
- Children with a history of epilepsy must be treated with care, under the supervision of a pediatric consultant to adjust their medications in the event of increased frequency of fits.
- Children with autistic disorders showed minimal improvement only.
- Children with genetically abnormal brain development may benefit in some aspects of their disabilities, but no promises should be made.

Early use of this modality of therapy may help to reduce the numbers of handicapped children.

### **Acknowledgement**

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