

Oro-Motor Function and Facial Asymmetry in Cerebral Palsy

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ABSTRACT

Background: Cerebral palsy is a disabling disorder that affects motor function of the person leading to many other health related problems and dependency on others for meeting basic requirements and needs. Exact cause of it is not known but many reasons have been speculated. Once afflicted endeavors are made to make one's living better. The facial regions suffers in the form of oro-facial musculature being involved leading other bony, soft tissue and dental changes. Studies in India, done on cerebral palsy patients, focuses on oral health mainly. This short study was done to bring our focus to muscle and bony changes in ones suffering from cerebral palsy as compared to a control group of normal subjects.

Keywords: Dentistry, facial asymmetry, oro motor function.

INTRODUCTION

Cerebral palsy (CP) is not a specific disease entity but rather a collection of disabling disorders caused by insult and permanent damage to the brain in the prenatal and perinatal periods, during which time the central nervous system is still maturing. This disability might involve muscle weakness, stiffness, or paralysis; poor balance or irregular gait; and uncoordinated or involuntary movements,¹ resulting in significant impairment of functional mobility. The overall prevalence of cerebral palsy is reported to be about 2 per 1000 live births worldwide.² The four major subtypes are spastic, dyskinetic/athetoid (slow, writhing involuntary muscle movement), ataxic (low muscle tone and poor coordination), and mixed cerebral palsy, with spastic forms being the most common. (ICD 9 code 343.9)[factsheet].³ Many studies have been conducted for the etiology, clinical spectrum and distribution of clinical types, but relatively few

articles appear in the literature concerning the oro-facial condition of cerebral palsy patients in the Indian scenario. There have been studies on their dental status which show dental problems associated with suffering from cerebral palsy include carious teeth, periodontitis, malocclusion, bruxism and drooling.^{4,5,6,7}

According to Maria (2002) and Vaughan, Neilson and O'Dwyer (1988), patients with CP who are more neurologically compromised have higher functional involvement of the masticatory system and structural involvement.^{8,9} The present study assessed the correlation between the type of Cerebral palsy and oral motor function/rigidity in 25 subjects afflicted with cerebral palsy against a control group.

METHODOLOGY

For the study group, Twenty five patients between the age range of 6 and 27 years

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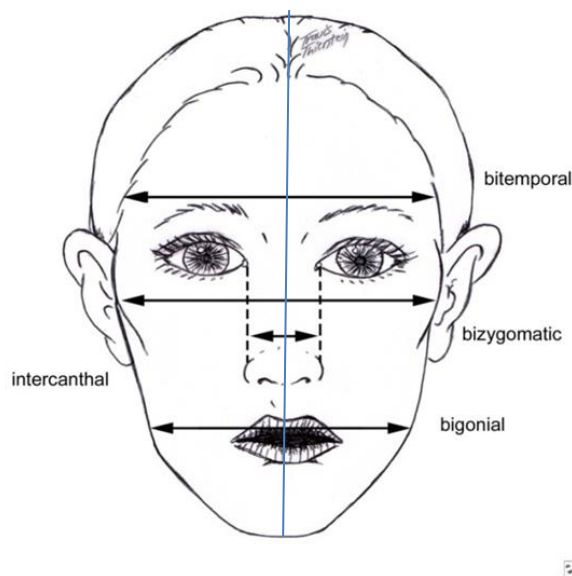
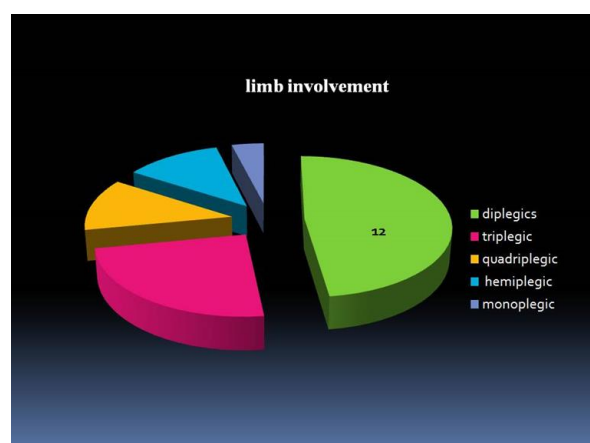
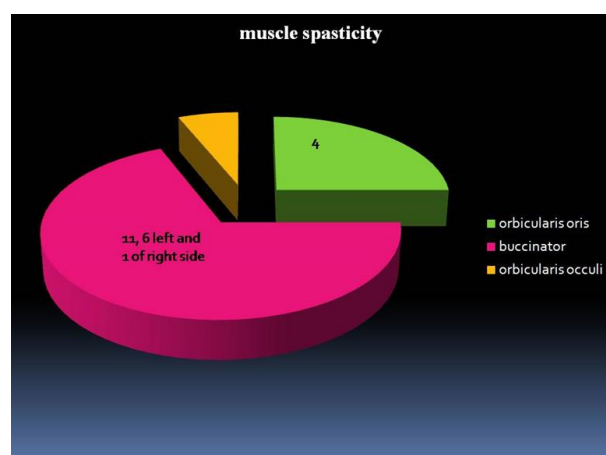


Fig 1: Schematic Diagram of Bitemporal, Bizygomatic and Bigonial Widths.



Graph 1: Limb involvement among cerebral palsy subjects (study group).



Graph 2: Facial Muscle Involvement among cerebral palsy subjects (study group).

suffering from cerebral palsy attending the outpatient Department of Narayan Sewa Sansthan, Udaipur, India were randomly included in the study, over a period of three months. Children having mental disorder other than CP and major medical issues was excluded from the study. Control group comprised of the same number of subjects who were gender - matched, corresponding to the study group, from the OPD of darshan dental college and hospital, Udaipur. Patient's parent/guardian were required to sign an informed consent for clinical examination of the patient. The study was carried out with a total of 50 subjects, 25 with CP and 25 normal children.

A custom made Performa was filled after taking complete history and clinical evaluation. For review of systems and type of cerebral palsy of study group, CP Centre Case-sheet was referred. Oral musculature was evaluated based on visual examination and on palpation of it in relaxed state and when in function. Motor function of Cranial nerves V, VII, X, XII was evaluated.^{10,11,12,13} The evaluation of facial asymmetry was done by assessing patient's frontal profile picture¹⁴ using coral draw 2010. Three lines were drawn horizontally parallel to FH plane and to each other (figure1). 1st- bitemporal i.e. most lateral point on each side of forehead. 2nd -Bizygomatic i.e. the most lateral point of the soft tissue overlying each zygomatic arch (zygion). 3rd -Bigonial i.e. soft tissue overlying the most lateral point of each mandibular angle (soft tissue gonion). Each extreme point in the respective line was measured from midline¹⁵ as bitemporal width (BTW), bizygomatic width (BZW) and bigonial width (BGW) respectively and compared. A master chart was prepared using 2007 Microsoft Excel sheet by assigning numerical values for all the parameters of the study and following observations were made.

RESULTS

The 25 subjects included in the study group were within the age range of 6 and 27 years with an average age of 16 years and 8

months. Of which 19 were males, 6 females. Control group consisted of 25 random subjects within age range of 12 to 25 years having an average age of 18 years. In the study group, out of the 25 subjects, 21 had spastic cerebral palsy i.e 84%. On evaluation of Limb involvement 12 were diplegic, 6 triplegic, 3 hemiplegic, 3 quadriplegic and 1 monoplegic. (Graph 1) As noted in the present study that 7 patients had involvement of buccinator of one side atleast, 4 had involvement of both orbicularis oris and buccinator muscle bilaterally. (Graph 2) 12 patients with involvement of muscles of mastication, had difficulty in mouth-opening to some degree (mild to moderate). Facial asymmetry was marked in 12 subjects of the study group with atleast one half of face (bitemporal, bizygomatic and bigonial) more than 5 mm larger than the other side. None of the control group showed such features.

DISCUSSION

Though a number of studies have been done on dental status of the patients suffering from cerebral palsy, almost none are around to discuss the effect of spastic oral muscles on oral environment, functions, facial structures and its changes. This short study is an attempt to bring to notice the difficulties faced by such patients and their care-givers in their endeavor to provide and fulfill basic needs like food, nutrition and hygiene.

According to a study done in India by Singhi et al. (2002), spastic quadriplegia constitutes the predominant group (61%), followed by spastic diplegia (22%).¹⁶ In our study, out of the 25 subjects, 21 had spastic i.e 84%. Also 7 patients had involvement of buccinator of one side atleast, 4 had involvement of both orbicularis oris and buccinator muscle bilaterally (Graph 2). 12 CP patients showed involvement of muscles of mastication, had difficulty in mouth-opening to some degree (mild to moderate). There have been studies that report that lesions in the CNS may cause involuntary movements, excessive contortions, stiffness in muscle groups, as well as limitations in voluntary movements of face and masticatory muscles.¹⁷ It has been observed that the presence of the dysfunction, as well as mouth opening limitation and reduced

occlusion strength (biting), are correlated with CP patients.¹⁸

Out of 25 CP patients, 12 had atleast one side of face more than 5 mm larger than the other side, which is marked facial asymmetry as per Shaner et al. (2000). They in their study have pointed out that the normal limits of soft tissue asymmetry in the measurements taken from the upper and middle regions of the face does not exceed 5 mm in males and 6 mm in females as a general rule.¹⁹ The influence of the muscular system on the morphology of the bones has long been recognized [Moss, 1962]. Vargervik and Miller [1984] support the idea that the epigenetic regulation of the bone is performed by muscles, according to the functional matrix theory. It is also reported that the asymmetry of neuromuscular functions and the masticatory apparatus can lead to an asymmetry of the mandible and the cranium and facial asymmetry inducing muscle dysfunction too [Captier et al., 2006]. Observation is that when asymmetric forces act on the calvaria, craniofacial asymmetry often results.²⁰

Problems with orofacial musculature and structure can create difficulties in jaw relations, TMJ, occlusion, speech, swallowing, feeding. This situations only worsens with age as normal bone growth and functions fail to progress at the normal pace.

CONCLUSION

Cerebral palsy is a disorder needing multifunctional approach/management. It has been observed in the above study that majority of patient being spastic suffer from oro-facial musculature stiffening, difficulty in jaw movements and facial asymmetry.

We as dental care-givers focus on treating the oral health status which is a symptom of underlying malfunctioning oro-motor complex. It's time we diverted our attention to the main cause leading up to it and find ways to correct them. This is an attempt to bring forth the problem; further studies are required to put light on the subject.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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