Birth delivery trauma and malocclusion

Ruggero Cattaneo* / Annalisa Monaco** / Oriana Streni*** / Vittorio Serafino**** / Mario Giannoni*****

The aim of the investigation was to determine the dynamic of birth delivery and relate to dental occlusion among a group of adult subjects. The group studied was made up of 106 subjects (57 females and 49 males) referred for dental diagnosis and treatment. The average age was 26 with a range 22 to 30 years. In data collection and analysis the following were used as measures: dental occlusion (Angle Class I, II div 1, II div 2 and III) and type of delivery (normal, short, long, caesarean and other). Results showed that among 106 subjects 72 (68%) had malocclusion versus 34 (32%) with normal occlusion; 24 subjects (22.6%) have been normal delivery versus 82 (77.4%) with non-normal delivery. Class I is present in 34 subjects (32%), class II division 1 in 26 (24%), class II division 2 in 22 (20%), class III in 16 (14%), and 8 subjects (6%) fall in the section "other". Among 24 subjects with normal delivery 100% presented class I occlusion. However, among 82 subjects with non-normal delivery 10 subjects had a class I (12.2%) and the 72 (87.8%) had in the other classes, are distributed in the various subgroups of non-normal labor/delivery. None of the subjects with a malocclusion have a normal labor/delivery. Better understanding of the connections among osteopathic theory, craniosacral treatment and the outcomes upon dental occlusion, more rigorous evaluations are warranted.
J Clin Pediatr Dent 29(3): 185-188, 2005

INTRODUCTION

Malocclusion is a frequent event among the general population. The incidence in literature ranges between 50 and 87%.[1-5] Factors directly related to the causes of the malocclusion are several: finger sucking, biting or chewing objects, cheek biting, prolonged use of a pacifier, traumas, genetic factor, dental agenesis, etc, but this only partly explains this alteration of the growth.[6-8]

The number of malocclusions that we can define "primary" is a lot more. The muscular theory (Moss Functional Matrix) allows clarifying the pathogenesis of the majority of primary malocclusions,[6,8,9] but it focuses the attention on the causes of the altered functional dynamic of the fascial muscle. Unfortunately sometimes a pathogenetic mechanism was identified with the etiology of the morphological alterations.

The growth of the face is strictly related to the growth of the neurocranium, which depends on the growth of the brain.[8] During the first two years of life the brain size grows of three times. This period of dramatic growth is not much studied by dental epidemiology besides major traumatic events or severe development defects, but it is obvious that this period of such a big change may lead to many variations to the final result.

Moreover, the role of the tongue must be considered, today it was one of the most important organs in the modeling of oral spaces because of the strong and essential function: suction and deglutition.[10,11]

At birth the tongue has a mass that already equals 50% of an adult, while the rest of the body will grow six times from birth to adult life. At birth, the tongue has a noticeable strength. The function is to actuate a drive to the survival of the individual even in unfavorable conditions. In this sense, altered lingual posture and deglutition, often present in the general population,[12-14] must be present at birth, and must be intended as effects of growth alterations originated by causes started in perineonatal period.

Osteopathic theories trace neuromuscular and articular dynamics to the primary movement of cranial respiration and through this to the fascial structures wrapping the body.

* Ruggero Cattaneo, Member of International Academy of Posture and Neuro-muscular Occlusion Research (I.A.P.N.O.R.), S. Benedetto, Italy.
** Annalisa Monaco, Department of Odontostomatological Clinic, School of Dentistry, University of L'Aquila, Italy.
*** Oriana Streni, Department of Odontostomatological Clinic, School of Dentistry, University of L'Aquila, Italy.
**** Vittorio Serafino, Member of International Academy of Posture and Neuro-muscular Occlusion Research (I.A.P.N.O.R.), S. Benedetto, Italy.
***** Mario Giannoni, Department of Odontostomatological Clinic, School of Dentistry, University of L'Aquila, Italy.

It is interesting to observe that Frymann[15] in a study of 1250 children indicates the complications that osteopathic delivery trauma induces on cranial dynamic, on the subsequent abnormal craniofacial shape, and neuromotor development. Her study shows that "osteopathic disorder" of the occipital condyle is very frequent; through the condyle canal the XII pair of the cranial nerves exits the cranium to innervate the lingual muscle.[16,17] So it is assumable that a delivery trauma may cause a disorder in two ways: an alteration of cranial growth and an alteration of suction-deglutition pattern, and eventually leading to irregular facial spaces. Malocclusion represents the result of irregular oral spaces.

MATERIALS AND METHODS

In order to evaluate the existence of this connection, this study wanted to evaluate, if the delivery dynamic (as considered by the osteopathology) may affect the posture of the tongue, which will affect the normal development of the dental arches.

Based upon these conditions, the goal of study is to evaluate the dynamics of delivery, from the osteopathic point of view, in relation to the type of dental occlusion, to track down the chain of events that determines the neuromotor and postural control of the tongue and stomatologic system.

So 106 people (49 male, 57 female), age between 6 and 40 (average 22-30), that showed up spontaneously for various dental problems, were selected for this clinical trial. An oral examination and occlusion evaluation was provided, following the classic Angle's keys.

In order to simplify, the following classes were considered: class I, class II division 1, class II division 2, class III, and "other", to include the classes not easily classified (i.e. class I malocclusions). Actually, the concern of the study was more basic: to distinguish between class I normal occlusion and all the other types of malocclusion.

To evaluate the delivery dynamics the patients were asked for an interview of which they ignored the purpose till it was over, and sometimes it was diversified to collect the missing information. The section of the interview regarding study was as simple as possible, based fundamentally on the duration of the labor/delivery as an indication of the force exerted on the cranium of the baby.[15] The following points were evaluated:

- Short or quick duration: less than 6 hours;
- Long or slow duration: less than 12 hours;
- Normal duration: between 6 and 12 hours;
- Cesarean section;
- Other

Following the criteria just listed, the term "Normal" osteopathic labor/delivery, and *"partus difficilis"* (dystocia), does not correspond to the concept of non-normal osteopathic labor/delivery, which has a broader meaning.

RESULTS

The study showed the following results:

Figure 1 shows the distribution of the subjects (106 people) between "malocclusion" and "normal occlusion" respectively 72 subjects (68%) versus 34 (32%).

Figure 2 shows the distribution of the subjects between "normal labor/delivery" and "non-normal labor/delivery": respectively 24 subjects (22.6%) versus 82 (77.4%).

Figure 3 shows the incidence of the single "types of labor/delivery" that have been considered.

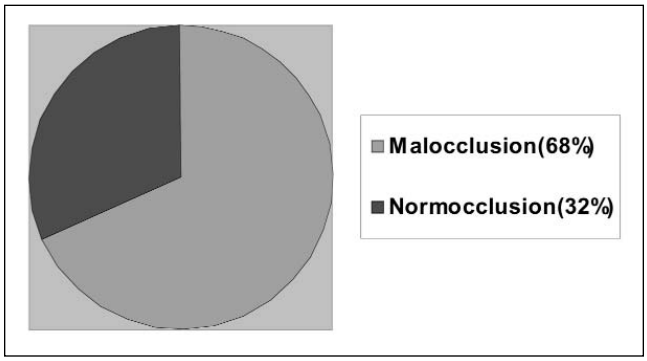

Figure 1. Percentage of subjects with and without malocclusion

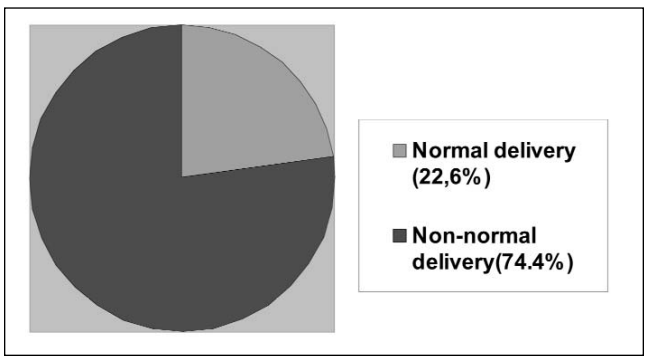

Figure 2. Percentage of subjects with normal delivery and with non-normal delivery.

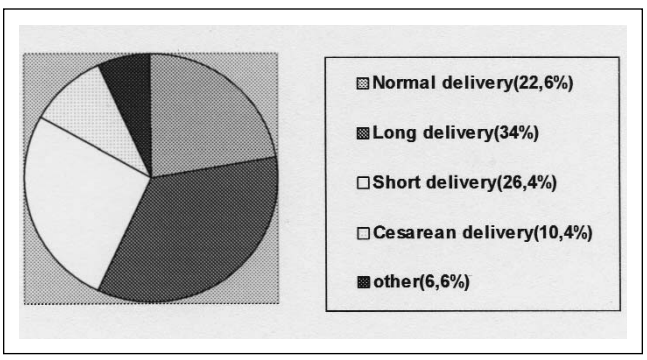

Figure 3. Distribution of subjects according to the tpe of delivery.

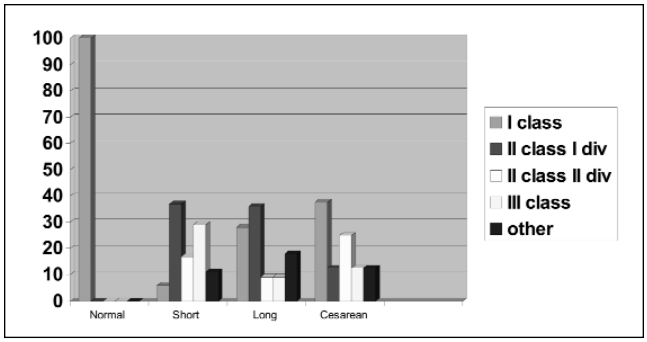

Figure 4. Distribution of dental classes according to kind of delivery.

The section "other" includes various elements, such as complications that may have caused stress to the fascial-muscular structure of the baby.

Figure 4 shows the distribution of Angle's dental classes related to the type of labor/delivery of the 106 subjects. And in the same figure we can also see the incidence of the various dental classes.

The section "other" includes the types of malocclusions not classified in our criteria. Class I is present in 34 subjects (32%), class II division 1 in 26 (24%), class II division 2 in 22 (20%), class III in 16 (14%), and 8 subjects (6%) fall in the section "other".

Among 24 subjects with normal delivery 100% presented class I. Instead among 82 subjects with non-normal delivery, 10 subjects falling in class I (12.2%) and the 72 (87.8%) falling in the other classes are distributed in the various subgroups of non-normal labor/delivery.

None of the subjects with a malocclusion have a normal labor/delivery.

Figures 5 to 8, show the same variables, but on a group taken from the general group, subjects with less than 12 years of age. Out of 35 subjects (33% of the total) 9 (25%) have a normal occlusion, and 26 (74%) present a malocclusion. Seven (20%) had a "normal" labor/delivery and 28 (80%) a non-normal labor/delivery.

Figure 8 shows the following result: the 7 subjects that had a "normal" labor/delivery present a class I occlusion, the other 2 subjects also a class I, and the remaining 26 subjects, which are not in class I are distributed in the groups of "non-normal" labor/delivery.

CONCLUSIONS

Data in accordance with the previously existing in literature pertaining the incidence of malocclusion: 68% (72 subjects) have some kind of malocclusion.

In the only original study that we are acquainted, Frymann[15] observes that 78% of the 1250 infants suffered, during labor/delivery, for osteopathic dysfunctions of cranial articulations determined by mechanical forces exerted on the head of the baby by the pushes of the mother.

In the same study the author finds that approxi-

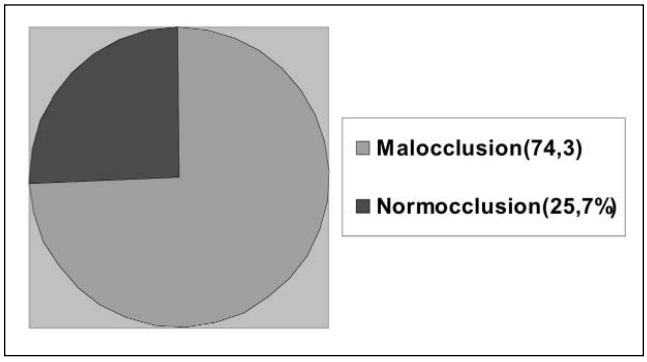

Figure 5. Percentage of subjects with and without malocclusion

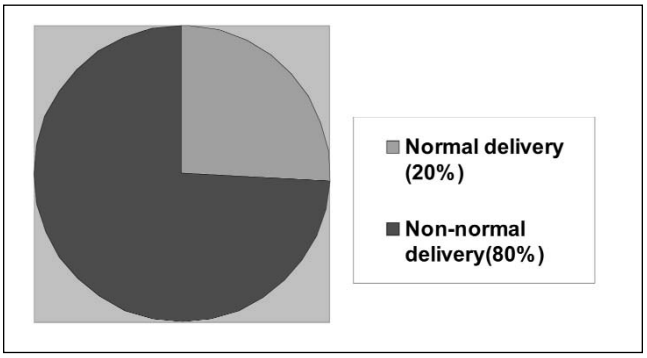

Figure 6. Percentage of subjects with normal delivery and with non-normal delivery.

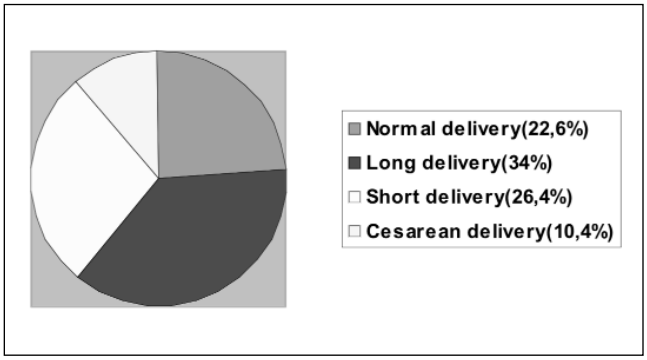

Figure 7. Distribution of subjects according to type of delivery

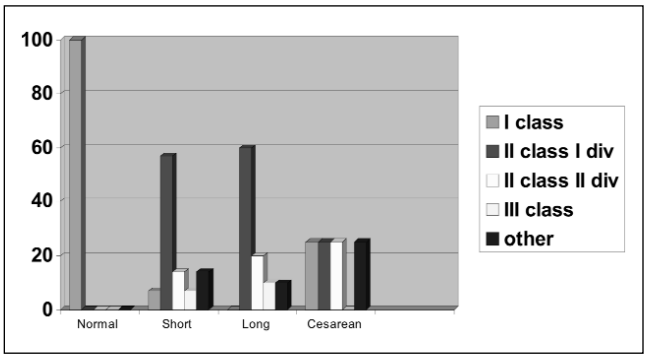

Figure 8. Distribution of dental classes according to kind of delivery among children with less than 12 years of age

mately 70% of the infants were born after too long or too short labor/delivery (which implies stress for the baby) and only 30% after a labor/delivery from 6 to 12 hours, which is considered "normal" by Frymann.[14,15] These data are close to the that found in our sample, where only 23% of the subjects have a "normal" labor/delivery for length of time.

According to this study, only the people, who have a normal occlusion, had a "normal" labor/delivery duration. None of the subjects having any type of malocclusion had a labor/delivery of "normal" duration.

How should the data be interpreted? Are the data just a statistical aberration, a coincidence, or without getting to the heart of the matter of a relation between cause and effect, could they suggest to reflect on the genesis of malocclusions? In particular, the development of the splanchnocranium is influenced by the growth of the brain[8,13] and therefore, of the neurocranium.

At birth, the weight of the brain is about 25% of an adult brain, at six months 50%, at the age of 2 about 75%, and at 6, when tooth eruption begins, it is 90% of the weight of an adult brain.[13]

Therefore, the neurocranium has to adjust itself quickly to the size of the brain. The traumas that the membranous suffered during the prenatal period and moreover during labor and delivery, may cause an alteration of the lines or forces of growth that will lead to an irregular development of the neurocranium first, and afterwards of the face.

In a phase of rapid growth a small deviation may determine evident alterations of the relation between the cranium, the base, and the splanchnocranium.

At the age of six, when the growth of the brain and therefore of the cranium is almost completed, the beginning of teeth eruption and substitution of the primary teeth with the bigger, permanent teeth, will make any discrepancy between dental and skeletal structure more evident.

Besides, the occipital-condyle dysfunction[14,15] is the most common after a "non-normal" delivery. At the base of the occipital condyles, the condylar canal is the passage of the XII pair of the cranial nerves (hypoglossus). This nerve innervates most part of the musculature that governs the posture and movement of the tongue. It is known how the tongue is fundamental for the evolution of the primary swallowing-suctioning function,[10] and how the posture of the tongue and function influence the development of the relation between the maxillas and the arches, since many reliable researchers have written about its hallmarks and proved its influence.[6,9,10,18]

Obviously, the number of subjects that our study has evaluated is not sufficient to give statistical value to the matters, but I believe they can point out some clues for those who want to study in depth in that direction. If this theory is corroborated, it can give an interesting outlook on malocclusion primary prevention and precocious treatment.

These observations are not intended to support a theory rather than other theories, at least as long as they are not supported by more reliable researchers; our hope is to start a discussion over a topic still unacknowledged, but clinically interesting and stimulating.

REFERENCES

1 Miotti FA. Epidemiological study and orthodontics. Mondo Ortod 16: 265-74, 1991.
2. Keski-Nisula K, et al. Occurrence of malocclusion and need of orthodontic treatment in early mixed dentition. Am J Orthod Dentofacial Orthop 124: 631-8, 2003.
3. Onyeaso CO. An epidemiological survey of occlusal anomalies among secondary school children in Ibadan, Nigeria. Odontostomatol Trop 26: 25-9, 2003.
4. Liepa A. et al. Orthodontic treatment need in Latvia. Eur J Orthod. 25: 279-84, 2003.
5. Lauc T. Orofacial analysis on the Adriatic islands: an epidemiological study of malocclusions on Hvar Island. Eur J Orthod 25: 273-8 , 2003.
6. Moyers. Manuale di Ortodonzia, Scienza e tecn. Dent., ed. Milano, International Co., 1991.
7. Di Malta E. Le terze classi. ed. Milano, Masson Co., 1992.
8. Enlow. Crescita cranio facciale, ed.Torino, Cides Odonto Co.,1986.
9. Moss ML, Salentijn. The primary role of functional matrices in facial growth. Am J Orthod 55: 566-7, 1969.
10. Cioni G, Ferrari F, Prechtl H. Motor assessment in the neonatal period, in motor development in children. 1st ed. London, J Libbey Co., 1994
11. Naoko Niikuni, Ichiro Nakajima., Morito Akasaka. The relationship between tongue-base position and craniofacial morphology in preschool children. J Clin Pediatric Dent 28: 131-134, 2004.
12. Sutherland WG. The cranial bowl: a treatise relating to cranial mobility, cranial articular lesion and cranial technic. Ed. Mankato, Minn. Free Press Co. 1966.
13. Magoun H.I. Osteopaty in the cranical field. Journal Printing Company, Kirksvill, Mo,1966.
14. Frymann V. A study of the rhythmic motions of the living cranium. J Am Osteopath Assoc 70: 928-45, 1971.
15. Frymann V. Relation of disturbances of craniosacral mechanisms to symptomatology of the newborn: study of 1,250 infants. J Am Osteopath Assoc 65: 1059-75, 1966.
16. Testut L, Latariet A. Anatomia Umana, UTET 1977.
17. Willard F.H. Medical Neoro Anatomy, Lippincot Co., 1993.
18. Garliner D. The importance of oro-facial muscle function and dysfunction in the treatment of various occlusal problems. Fortschr Kieferorthop 47: 215-20, 1986.