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PROFILE OF FACIAL SKULL SURGERIES OF THE SÃO JOSÉ DO RIO PRETO BASE HOSPITAL: LONGITUDINAL PROSPECTIVE STUDY

***Vanessa Gabriela Gonzales Pinto, Caroline Gabriele Marques and José Victor Maniglia**

Health Sciences Post-Graduation Program, Medicine School of São Jose do Rio Preto (FAMERP), São José do Rio Preto, São Paulo, Brazil

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ABSTRACT

Introduction: Orthognathic surgery is the treatment of choice for the correction of severe dentofacial deformities. It is based on the surgical manipulation of the bones of the face in order to correct anatomical relations, malocclusions and treatment of Sleep Apnea and Hypopnea Syndrome - OSAHS.
Objective: The objective of this study was to study the profile of orthognathic surgery of patients who were surgically treated in the otorhinolaryngology department and to analyze whether there was statistical significance by means of logistic regression between the patients' age and the orthognathic surgery profile.
Methodology: The present study was based on an observational study with a longitudinal prospective model, with an evaluation of the charts of patients submitted to orthognathic surgeries with statistical and descriptive procedures, from 2002 to 2016. The number of procedures, characteristics of individuals, Type of malocclusion and type of surgery performed for the treatment of dentofacial deformity and / or Sleep Apnea and Obstructive Hypopnea Syndrome - OSAHS. The patients were separated into 9 groups: maxilla (MX), mandible (MD), maxilla and mandible (MX/MD); (TM), maxilla-mandible-ment (MX/MD/MT); Mandible (MD/MT); (MT); Maxilla-ment (MX/MT); Maxilla-mandible-valve (MX/MD/ULVULA); Maxilla-rino (MX/RINO). The sample consisted initially of 152 patients treated in the service subdivided into two male and female groups. Both physical and electronic medical charts were evaluated and compared with data already collected in a previous sample.
Results: The present study showed that the number of orthognathic surgical treatments for the correction of deformities was significant between 2002 and 2016, and the highest incidence of surgeries occurred in the Maxila (MX) groups, with 52.5 % of the cases, Jaw (MD), with 17.7 % of the cases and Jaw and Jaw (MX/MD), with 16.3 % of the cases, as shown qualitatively and quantitatively in table 1 and figures 3 and 4. Surgeries of maxillary advancement (MX) exclusively correspond to the largest number of the sample, representing seventy-three (73) patients, as shown in figure 4. In addition, there was a higher incidence of female surgeries with 51.0 % of the cases. In addition, there was no influence of the continuous predictor "age" and "sex" on the predictor response "orthognathic surgery", since the critical level of significance was $p > 0.05$.
Conclusion: It was concluded that there was an increase in cases of orthognathic surgery in the last years, and with homogeneous samples between the male and female genders, and the advances in maxillary surgery corresponded to the greater number of surgical treatments.

****Corresponding author: Vanessa Gabriela Gonzales Pinto,***

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INTRODUCTION

Orthognathic surgery consists of the surgical procedure that aims to correct deformities of the bones of the maxilla and mandible and represents, today, a reality in Brazilian dentistry (Capelozza Filho, 2004 and Marques, 2010).

The technique has undergone great evolution in the last two decades and has been steadily increasing. The records of the first surgeries for the correction of dentofacial deformities date from the mid-nineteenth century and were initially limited to mandibular surgeries (AAOMS, 2005 and American Cleft Palate-Craniofacial Association, 1993).

The first procedure performed is credited to Simon P. Hullihen in 1849 in the United States (Aziz, 2004; Steinhäuser, 1996). The initial development of North American orthognathic surgery was by the hands of plastic surgeon Vilray Blair and the orthodontist Edward Angle. However, the most significant development in this period occurred in Europe, especially in Switzerland, Austria and Germany, with Obwegeser, Trauner and Wassmund as the main names respectively (Steinhäuser, 1996). In 1901, Frenchman René Le Fort released his research on maxillary fractures. He described in a comprehensive way the experimental research in which he simulated facial traumas in cadavers. Its main purpose was to assess whether traumas in the middle third of the face radiated to the base of the skull. In addition to answering his questioning, he was able to show clear patterns of fragility in the maxilla, the result of repeated fracture lines. Thus, the fracture classification system of the middle third of the face (Dyer, 1999; Le Fort, 1901; Noffze, 2011; Tessier, 1972). This classification ended up being widely used to name the types of maxillary osteotomies and the middle third of the face in orthognathic surgery. The malocclusion has as one of the primary etiological factors the facial growth pattern, defined as a set of rules that act on the growth and development of the face, preserving specific characteristics, genetically determined, suffering little or no influence of the environment (Capelozza Filho, 2004). Angle's statement already stated that the only possibility of correcting true dentofacial deformities was the combination of orthodontics with surgery, and the importance of the combined effort of these two distinct areas in approaching the dentofacial disharmony of patients with skeletal problems was recognized (Angle, 1899).

The facial deformity, with destructive psychological and social potential, has a negative impact and can influence not only patient self-confidence but also external relationships, resulting in social and psychological disadvantages. The objectives of the patient with dentofacial deformity, related to the repair, are also psychosocial and this can express the expectation of solving their personal and social difficulties with the physical change, that is, with the improvement of their appearance by the surgical correction (Nicodemo, 2007). Orthognathic surgery is involved in patients with moderate and severe dentofacial deformities of the face, with the main objective of centralizing the achievement of functional balance and harmony in facial esthetics (Hullihen, 1849). Obstructive sleep apnea is the arrest of the airway through the upper airway, in the presence of respiratory effort, lasting more than 10 seconds. The hypopnoea, constitute a reduction in the passage of air, in said area, in this same period of time. These respiratory events occur innumerable times and exclusively during sleep, determining symptoms and signs that characterize Obstructive Sleep Apnea Hypopnea Syndrome (OSAHS).

Patients with anatomical abnormalities that contribute to the narrowing or obstruction of the pharyngeal air space during sleep are benefited with orthognathic surgery to normalize the soft and hard tissues of the face (Marques, 2010). Obstructive sleep apnea and hypopnea syndrome because it is complex and multifactorial, has aroused interest in several specialties. It originates from recurrent upper airway obstruction during sleep. The interruption of the passage of air through the upper airway for more than 10 seconds causes several problems such as: daytime hypersomnia, systemic and pulmonary arterial hypertension, arrhythmias, fragmented sleep and sudden death, which represents a serious public health problem, justifying the need Early diagnosis and immediate treatment (Carine Petry, 2008). The most favorable conditions for OSAHS are: incompetent tone of the palate musculature, tongue and pharynx; Collapse of soft tissue on the airways secondary to macroglossia, retrognathia and micrognathia, excessive mucosal folds, accumulation of submucosal fat and obstructed nasal airway. Another study showed that patients with OSAHS have several atypical craniofacial features that include: retroposition of the mandible and maxilla, disorganized occlusal plane, protrusion of the incisors, obtuse gonial angle, increase in the height of the lower third of the face with tendency for anterior open bite, can be Associated with the increase of the size of the tongue, alteration in its tonicity and even retroposicionamento next to the posterior wall of the pharynx (Hammond, 2007).

Maxillomandibular advancement in the treatment of OSAHS

The aim of the surgical treatment of OSAHS is to enlarge the airways of the oropharynx by anterior and / or lateral displacement of the soft tissues and musculature by maxillomandibular advancement and, possibly, the genioglossus muscle. Treatment may also include correction of transverse problems with expansion, as part of the overall plan, and other soft tissue procedures, such as uvulopalatopharyngoplasty (Pinto, 2013). OSAHS affects about 4.0 % of men and 2.0 % of women, and their consequences can be of great risk to the general health of the patient, since there are behavioral and pathophysiological disorders associated with it3,4. The individual begins to become a reason for excessive daytime sleepiness resulting from nocturnal awakenings due to collapse of the upper airways (Schendel, 2011). Symptoms of OSAHS may include snoring, apnea, headaches in the morning, fatigue, post-lunch drowsiness, memory loss, irritability, poor performance at work, altered family relationships, and changes in libido11,12. Next, there are physiopathological changes of cardiorespiratory origin, with an increased risk of myocardial infarction, stroke and sudden death (Schendel, 2011; Li, 2011; Powell, 2009).

The cephalometric radiography aims to reproduce in a standardized way the facial proportions, expressed in linear and angular measurements. Its use in the evaluation of facial morphology (in lateral, frontal and basal standards) has been extensively studied. The various computerized cephalometric tracings available are valuable aid in the standardization and storage of data, as well as in the comparison between the values obtained and those considered as references of normality. The objective of this study was to study the profile of orthognathic surgery of patients who were surgically treated at the facial craniofacial otorhinolaryngology department of the São José do Rio Preto Base Hospital from 2002 to 2016. The specific objective was to analyze whether there was any significance By means of logistic regression between the patients' age and the orthognathic surgery profile.

MATERIALS AND METHODS

The present study was based on an observational study with a longitudinal prospective model, with an evaluation of the patient's files submitted to orthognathic surgeries with statistical and descriptive procedures. The research technique

was the indirect documentary using patient records from 2002 to 2016 in the Outpatient clinic of the Orthognathic Surgery Service of the Department of Otorhinolaryngology and Head and Neck Surgery of the Base Hospital of São José do Rio Preto / SP. The number of procedures, characteristics of the individuals, type of malocclusion and the type of surgery performed for the treatment of dentofacial deformity and / or Sleep Apnea and Obstructive Hypopnea Syndrome - OSAHS were identified. The patients were separated into 9 groups: maxilla (MX), mandible (MD), maxilla and mandible (MX / MD); (TM), maxilla-mandible-ment (MX / MD / MT); Mandible (MD / MT); (MT); Maxilla-ment (MX / MT); Maxilla-mandible-valve (MX / MD / ULVULA); Maxilla-rino (MX / RINO). The sample consisted initially of 152 patients treated in the service subdivided into two male and female groups. Both physical and electronic medical charts were evaluated and compared with data already collected in a previous sample.

Watson analysis were applied. For all linear regression tests, alpha level of 0.05 was adopted. For Durbin-Watson residue analysis, the reference significance level was 0.05, adopting as an acceptable interval of independence 1.63 <dw <1.72, with two explanatory variables, "sex" and "age".

Trial Design

The participants were submitted to the eligibility analysis, followed by the rules STROBE (Strengthening the Reporting of Observational studies in Epidemiology, link: https:// www.strobe-statement.org/index.php?id=strobe-home), model Observational, and the surgeries were performed by seventeen different residents.

Outcomes

Primary outcome: The primary endpoint was to analyze the greater incidence of surgeries in a prospective longitudinal

Table 1. Table showing the numerical outcomes after the analysis of the patients

Sample Size	Age Mean±SD	Gender	Students of Medicine-numbers	Orthognathic Surgery – types (%)	
				MX	52.5
		Female: 51,0		MD	17.7
	30.13±15.37	%		MT	1.4
	Minimum: 0	Male:	17	MX/MD	16.3
141	Maximum:109	49,0 %		MD/MT	2.8
				MX/MT	1.4
				MX/MD/MT	6.4
				MX/MD/ULVULA	0.71
				MX/RINO	0.71

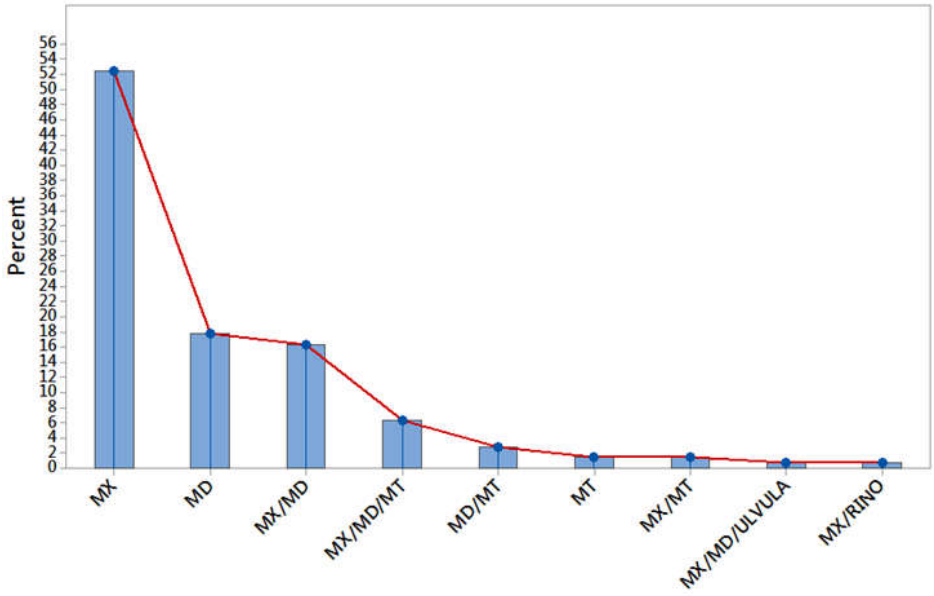

Figure 1. Graph showing percentage of the service profile quantification, with emphasis on maxillary surgery with 52.5%

Statistical analysis

The statistical analysis of the data was performed by an external collaborator and interpreted by the researcher, with the help of the advisor. For data analysis a database was built in the Microsoft Excel spreadsheet which was exported to the Minitab 17 statistical program. A common descriptive statistical analysis and Anderson-Darling normality test were performed for the variable "age". Pearson's correlation was applied to all weight values, with a confidence interval of 95.0% (p <0.05). As there was the presence of continuous predictors "age" and "sex" and predictor response "orthognathic surgery", linear regression and residual Durbin-

way that are admitted to the Base Hospital of São José do Rio Preto / SP.

Secundary outcome: The secondary endpoint was to observe the mean of regression analysis and residual if there was any relation of the higher incidence of certain surgery with the age of the patients.

RESULTS

The present study showed that the number of orthognathic surgical treatments for the correction of deformities was

significant between 2002 and 2016, with the highest incidence of surgeries occurring in the Maxila (MX) groups, with 52.5 % of the cases, Mandible (MD) , With 17.7% of the cases and Maxilla and Jaw (MX/MD), with 16.3 % of the cases, as shown qualitatively and quantitatively in Table 1 and Figures 1 and 2. Maxillary advancement surgeries (MX) Only correspond to the largest number of the sample, representing seventy-three (73) patients, as shown in Figure 2. In addition, there was a higher incidence of female surgeries with 51.0 % of the cases. Despite this, the quantification of male and female gender were homogeneous.

In addition, as a result, there was no influence of the continuous predictor "Age" on the predictor response "type of orthognathic surgery", since the critical level of significance was p> 0.05 (p = 0.87). In addition, Durbin-Watson's residual analysis confirmed that there was no dependency relationship between the predictors discussed above. As proof of this, by means of this residual analysis, whose value was dw = 1.68 for "Types of orthognathic surgery" x "Age", meaning that these values are between dL ≤ dw ≤ dU then the test is inconclusive 1.65 <dw = 1.68 <1.69, according to the Durbin-Watson standard table (Figure 3).

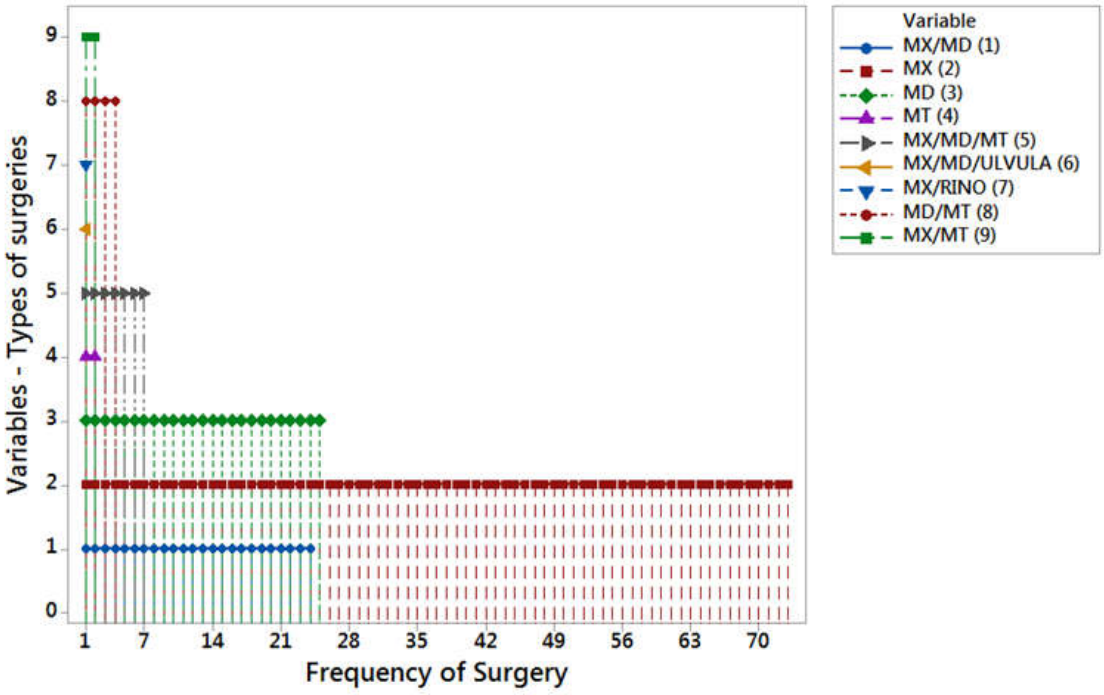

Figure 2. Graph showing the total number of patients who were attended in the period from 2002 to 2016, with 73 patients in maxillary surgery (MX (2))

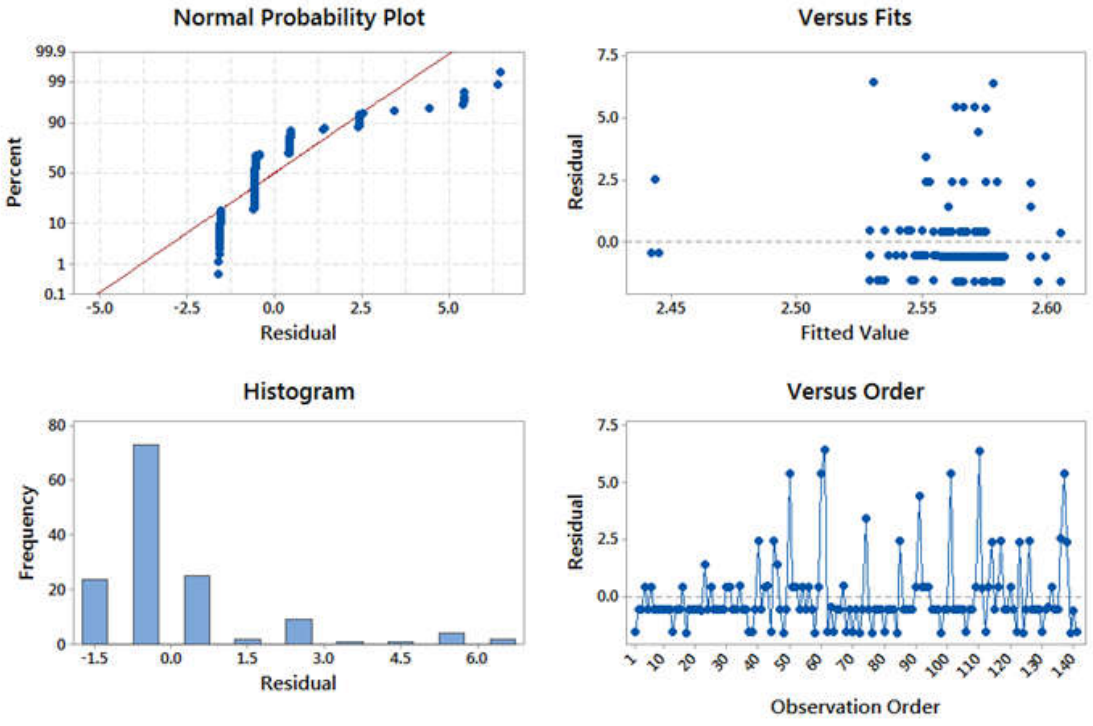

Figure 3. Durbin-Watson residual analysis graphs showing the behavior of influence between continuous predictors "age" and response "orthognathic surgery"

Likewise, there was no influence of the continuous predictor "sex" on the predictor response "orthognathic surgery", since the critical level of significance was p> 0.05 (p = 0.95). In addition, Durbin-Watson's residual analysis confirmed that there was no dependency relationship between the predictors discussed above. As proof of this, by means of this residual analysis, whose value was dw = 1.68 for "Types of orthognathic surgery" x "Age", meaning that these values are between dL ≤ dw ≤ dU then the test is inconclusive 1.63 <dw = 1.68 <1.72, according to the Durbin-Watson standard table (Figure 4).

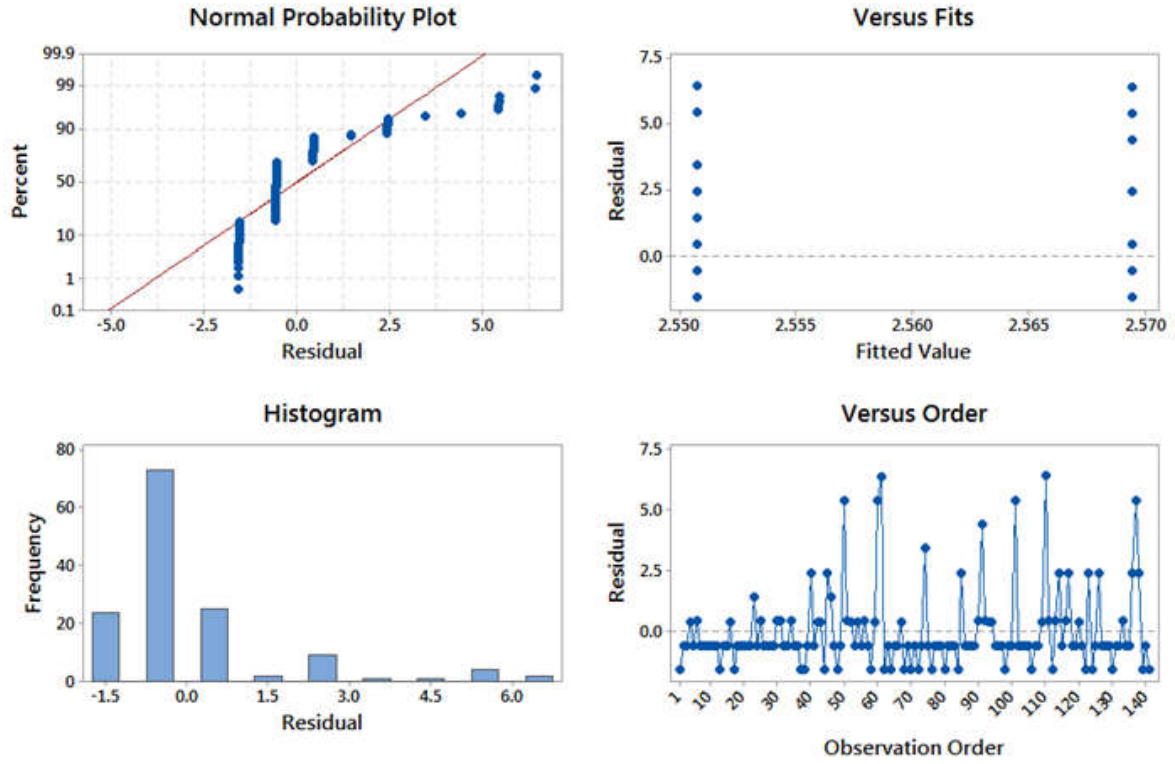

Figure 4. Durbin-Watson residual analysis charts showing influence behavior between continuous predictors "sex" and "orthognathic surgery" response

These results are confirmed by Figures 3 and 4, where the following analyzes can be followed for the data of "Age" x "Orthognathic Surgery" and "Sex" x "Orthognathic Surgery": the residuals appear to follow a straight line; There is no evidence of discrepant points or unidentified variables; The residues appear to be randomly scattered around zero; There is no evidence of non-constant variance, absent terms, discrepant points or influential points; The histogram does not follow a normal curve; The residues appear to be randomly scattered around zero and there is no evidence that the error terms are correlated with each other.

DISCUSSION

The treatment of dentofacial deformities is currently one of the most discussed fields in the area of Buccomaxillofacial and Craniomaxillofacial Surgery. His study has encompassed biological, pathophysiological, surgical and anesthetic techniques, pre and postoperative management, as well as craniofacial growth and development, and harmony and aesthetic relationships of the face (AAOMS, 2015 and American Cleft Palate-Craniofacial Association, 1993). In the present study, the prevalence of female patients with 51.0 % of cases followed the trend described in other studies involving orthognathic surgery (Bailey, 2001; Cunningham, 2009; Proffit, 2013 and Scariot, 2010). Women are more concerned about health and aesthetics, and seek treatment more often. In addition, the mean age was higher in relation to some studies conducted in other countries (Cunningham, 2009; O'brien, 2009). Still, Brazilian studies showed values of average age very close to the values obtained in this study (Marques, 2010; Castro, 2013 and Sato, 2014). One hypothesis for the mean age of the elderly may be the fact that the majority of the Brazilian population presents difficulties in accessing health care in a particular way or does not have supplementary health coverage.

According to the National Health Survey conducted in 2013 (IBGE, 2016), only 32.8 % of the population in the South region and 27.9 % of the Brazilian population had any health plan (Farhad, 2016). The high prevalence of maxillary and mandibular joint deformities and the large number of combined maxillary and mandibular surgeries seem to demonstrate the severity of operated dentofacial deformities (Samman, 1991). As the most frequent maxillary deformities were anteroposterior deficiency and the anteroposterior excess in the mandible, it is possible that there were a large number of patients with skeletal class III seeking treatment. Individuals with class III dentofacial deformities are those who normally present greater aesthetic and functional impact, and for this reason are the ones that most frequently seek treatment (Proffit, 2013). In the present study, combined maxillary and mandibular surgeries were third in frequency. The mean age was higher for these procedures compared to isolated maxillary and mandibular surgeries. These data demonstrate a more conservative planning trend in older patients, focusing more attention on functional alterations and patient complaint than on facial aesthetics. In addition, more extensive surgical procedures are usually at a higher risk for complications, and, moreover, the greater the potential for healing and recovery, the older the recovery tends to be. In addition, in the present study, no correlation was found between the occurrence of

complications and age and sex, but some studies have shown a tendency for complications to occur in older patients submitted to orthognathic surgeries (Al-Bishri, 2004; Kriwalsky, 2008; Panula, 2001). The need for the development of correction centers for dentofacial deformities in our country is notable for the increased demand for these services as shown in this study during the study period from 2002 to 2016. These data demonstrate the need for constant scientific and technical improvement, as well as Understanding the profile of these treatments for the increasingly objective treatment of these deformities. In addition, it was observed in the present study proximity between male (49.0%) and female (51.0%). This fact contradicts most reports in the literature on patients with orthodontic-surgical treatment [19,20,21] in which the female tends to be larger than the male, demonstrating a more critical perception of self-image, as well as a Greater degree of adherence to this type of treatment by women. In continuation, orthognathic surgery treats dentofacial deformities and its importance lies not only in the correction of occlusion, but also in facial aesthetics.

This means that psychosocial aspects are directly related to this type of treatment, since facial appearance influences the formation of body image, identity and self-esteem, with a higher demand for women. However, the gender homogeneity of the present study may be explained by the fact that these orthognathic surgery patients treat not only aesthetic-functional deformities but also OSAHS, more frequently in the male gender [22]. A similar study to the present study presented similar findings. An important finding in this research was that 56.0 % of the patients had operated exclusively on the maxilla and that 20.5% of the patients had the maxilla and mandible operated, representing 76.5% of the analyzed sample6. It can be observed that many of the patients with malocclusions have maxillary problems in association with mandibular problems, which calls us to a precise and detailed diagnosis of malocclusion and face, considering all the structures involved, both separately and together, so that the Treatment plan is successful, not only due to the occlusal aspect, but also aesthetic and functional, guaranteeing stability to the skeletal, dental, muscular structures and respiratory function aiming at the treatment of retropalatal and retrolingual collapse in patients with Apnea Syndrome and Obstructive Hypopnea Syndrome Sleep (OSAHS) (Marques, 2010). The results of the study provide an overview of orthognathic surgeries performed and reveal some risk factors for the occurrence of complications.

From the analysis of the data, the causes of the most frequent problems can be investigated, so that the treatments can become increasingly safe. It is suggested to pay attention to fragility points, to encourage compulsory and detailed recording of the occurrence of complications, as well as the elaboration of a protocol to monitor its evolution. There is still a need for attention to the management of male patients submitted to orthognathic surgery. Mandibular surgical procedures with maxillary segmentation and combining three types of osteotomies should be carefully planned and trained in order to reduce the occurrence of complications. The surgeon, orthodontist, and all staff involved should be focused on avoiding complications during all phases of treatment. The permanent improvement of the surgical technique, materials used, methods of orthodontic treatment, and experience are necessary to achieve this goal.

Conclusion

It was concluded that there was an increase in the cases of orthognathic surgery in the last years, and with homogeneous samples between the masculine and feminine genres, and the advances of maxillary surgery corresponded to the greater number of surgical treatments.

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