

Antibiotic protocols in orthognathic surgery: A single institution study

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ABSTRACT:

Aim: The aim of this study was to assess the antibiotic protocols in orthognathic surgery.

Materials and methods: This was a retrospective, descriptive study, where all the data of the patients who reported to the dental clinics in Saveetha dental college, SIMATS, Chennai, India, was obtained from the dental information archiving software (DIAS). Patient records were collected between March 2020 and March 2021. Data was collected and tabulated. The collected data was further analyzed, recorded in Microsoft Excel software and was subjected to statistical analysis using IBM SPSS statistics analyzer v.23.0.

Results: The total sample size of the current study is 41 patients who have undergone orthognathic surgery. In this study, the data was analyzed for the presence of antibiotic protocols for orthognathic surgery. Satisfactory results demonstrating antibiotic protocols were obtained. The highest prevalence of orthognathic surgery was observed in females and the most common site for orthognathic surgery were both arches. The most common antibiotics prescribed for patients who have undergone orthognathic surgery was a combination of cephalosporin and metronidazole.

Keywords: orthognathic surgery, cephalosporins, antibiotic protocols, metronidazole, penicillin. Clindamycin.

INTRODUCTION:

Orthognathic surgery is the art and science of diagnosis, treatment planning and execution of treatment by Orthodontics and oral and maxillofacial surgery to correct musculoskeletal, dento osseous and soft tissue deformities of the jaws and associated structures. It is performed in patients to reposition the jaws for those who are too old to undergo growth modification procedures and for conditions too severe to be corrected by using Orthodontics alone (1,2). Although Orthognathic surgery is considered to be relatively safe, as with any surgery, risk of postoperative infection is ever present (3,4). Techniques and procedures in Orthognathic surgery keep changing over the years and the chance for infection keeps changing without a set protocol (5,6). It was found in a study by Meltomaa ss et al, 2000 the rate of SSI (surgical site infection) was found to be 4.7 %. Antibiotic profile access during Orthognathic surgery (OGS) is of utmost importance. This is done to reduce the incidence of postoperative infection. Lack of consensus is present with regard to the preferred drug and dosage. This is needed as recent spikes in antibiotic resistance are of growing concern (7–11). As with the administration of any medication, benefits should be weighed against any adverse complications (12).

The requirement of this study arises due to the increase in the number of orthognathic surgeries for the correction of dentofacial and craniofacial deformities in recent decades. The percentage of patients who presented with surgical site infection also increased to 7% (13). This study will aid dental professionals gain awareness about the antibiotic protocols in orthognathic surgery for the prevention of postoperative infection. Our team has extensive knowledge and research experience that has translated into high quality publications (14–33). The aim of this study is to assess the antibiotic protocols in OGS.

MATERIALS AND METHODS:

This is a retrospective descriptive study conducted among patients who reported to Saveetha dental college and hospitals, SIMATS, Chennai, India and had undergone orthognathic surgery. Data were obtained from the dental information archiving software (DIAS). This setting came with various pros and cons. The pros included the presence of a larger population and an abundant availability of data. Some of the cons included the study taking place in a unicentred setting and possessing a very limited demographic.

The approval to undertake this research study had been obtained from the institutional ethical committee. Sample collection was performed from March 2020 to Decemeber 2021. 126 cases were reviewed and cross verification was performed by an additional reviewer. The minimisation of sample bias was performed by an additional reviewer, acquiring all the data from within the university and as an additional measure, simple random sampling was performed. Totally 82 case sheets were included for the study

The data was then arranged in a methodical manner using Microsoft Excel software and was tabulated on the basis of 3 parameters namely, gender of subject, location of the surgery/ surgical site and the antibiotic protocols followed - type and duration. Any incomplete or censored data that was present in the collected data was excluded from the study.

Statistical analysis of the compiled data was performed using IBM SPSS statistical analyzer V.23.0. The inclusion criteria for this study was patients over the age of 18 years who had undergone orthognathic surgery irrespective of their gender. The exclusion criteria included patients who did not undergo orthognathic surgery or incomplete data.

Dependent variables: type of antibiotics prescribed.

Independent variables: gender and type of OGS procedure.

RESULTS AND DISCUSSION:

The data was collected and sorted based on the 3 parameters mentioned previously. Fig. 1 explains the gender wise distribution of the study population. Out of 41 cases, a female predilection was observed with females making up 53.66% of the study population and males constituting 46.34%. In a study conducted by Parton, Andrew et al, 2011, in a total of 92 patients undergoing orthognathic surgery, a female preponderance was observed with 62% of the patients being female (34). This could be due to the reason that females were found to be more concerned regarding physical appearance compared to men over the lifespan and it was also found that women were more likely to seek professional advice and treatment (35–38).

Fig. 2 explain about the location/ surgical site of the OGS. It was observed that the majority of the patients underwent procedures in both arches (41.46%), followed by the lower arch (31.71%) and the upper arch with 26.83%. In a study conducted by Panula et al, 2001, it was found that bimaxillary surgeries were the most common procedure being performed , i.e. 445 patients out of 689 (3). The surgeries that involve both the jaws are usually done for the cases of facial asymmetry, combined anterior-posterior problems which involve both jaws and vertical/transverse discrepancies. These bimaxillary surgeries give leeway on the jaw positions as one jaw does not have to dictate the position of the other (39–41).

Fig. 3 indicate the antibiotic/combination of antibiotics prescribed to patients who have undergone orthognathic surgery. Out of the entire study population, the majority were presented with a combination of cephalosporin + metronidazole (82.93%), followed by a combination of penicillin+metronidazole (9.76%), cephalosporins alone (4.88%) and finally a combination of clindamycin+penicillin. The cephalosporin used in this current study was Taxim 200mg.

On analysis of literature, Orthognathic surgery came under the classification of clean – contaminated surgeries which means an operation which is conducted under controlled conditions and without unusual contaminations provided no evidence of infection or major break in a sterile technique is encountered (42–44). It was also observed in a study conducted by Baqain et al, 2004 that administration of prophylactic antibiotics exhibited significant benefits in reducing the occurrence of postoperative infection (45). Coming to the type of antibiotics, in a study performed by Beit et al, 1991, it was observed that penicillin and cephalosporin did not improve the prognosis and were also found to be relatively expensive compared to other antibiotics (5). Highest incidence of infections were found in the cases of Bimaxillary surgery without the use of Antibiotics (46,47). It was also observed in a study conducted by Yoda et al, 2000 that amoxicillin clavulanate was the most commonly used antibiotics for prophylaxis (48). Improvement of overall morbidity was observed in the case of 5 day profile access as seen in the study conducted by Bentley et al, 1999 (49).

In a study conducted by Heit et al, 1991 (5), it was observed that 100% responding dentists provided patients with antibiotic prophylaxis following orthognathic surgery. It was also found that penicillin was the most commonly prescribed antibiotic followed by cephalosporins. It was also stated that most of the studies did not show any significant therapeutic gain with cephalosporins and also mentioned a considerable difference in the cost (50,51). In another study conducted by Chow et al, 2007 (52), it was found that a combination of penicillin along with metronidazole was the most commonly prescribed antibiotic followed by cephalosporin which was prescribed to only 11.8% of the population. It was also found that prophylactic use of first generation cephalosporins were most effective compared to both penicillin and clindamycin for preventing SSI in orthognathic surgery (Davis et al, 2016) (53). Clindamycin was the least prescribed and the reason for this could be that patients who have been given clindamycin were more prone to infection by clostridium difficile (53,54). Theoretically third generation cephalosporins are known to be less active against Gram-positive bacteria than second generation cephalosporins, but they were found to be more active against Gram-negative bacteria however to determine which generation is of greater superiority is yet to be proven (55). The main reason why cephalosporin was found to be more advantageous compared to penicillin and is also the most widely used drug for postoperative prophylaxis in surgery is because The major advantage of many of the newer cephalosporins is their activity, often at lower concentrations than the older drugs, against multiply-resistant organisms (56,57). However, it was found that cephalosporin alone was significantly less effective than the combination of clindamycin plus gentamicin in preventing surgical site infections in head and neck surgeries (58). The trend in western literature is to use 2nd generation cephalosporins (cefuroxime) prophylactic antibiotics 30 min to 1 h before skin incision and preferable for 24 h to 3 days in intravenous infusion postoperatively (55). In the current study the most commonly used cephalosporin was cefotaxime which is a 3rd generation cephalosporin in combination with metronidazole to further combat anaerobic microorganisms. On further analysis of the obtained data, we also observed that there were no cases of reported post op complications with the current regimen.

CONCLUSION:

Within the limitations of the current study, it was observed that the choice for antibiotic prophylaxis was a combination of cephalosporin and metronidazole. It was also seen that females underwent more orthognathic procedures compared to males and the majority of the surgeries were performed in both arches. Hopefully this research study provides insight into the various antibiotic protocols and prevention of surgical site infections. This study will pave the way for future research with a larger population size and a wider demographic.

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CONFLICT OF INTEREST

Authors declare no potential conflict of interest for this study.

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Fig. 1 - gender wise distribution of the study population.

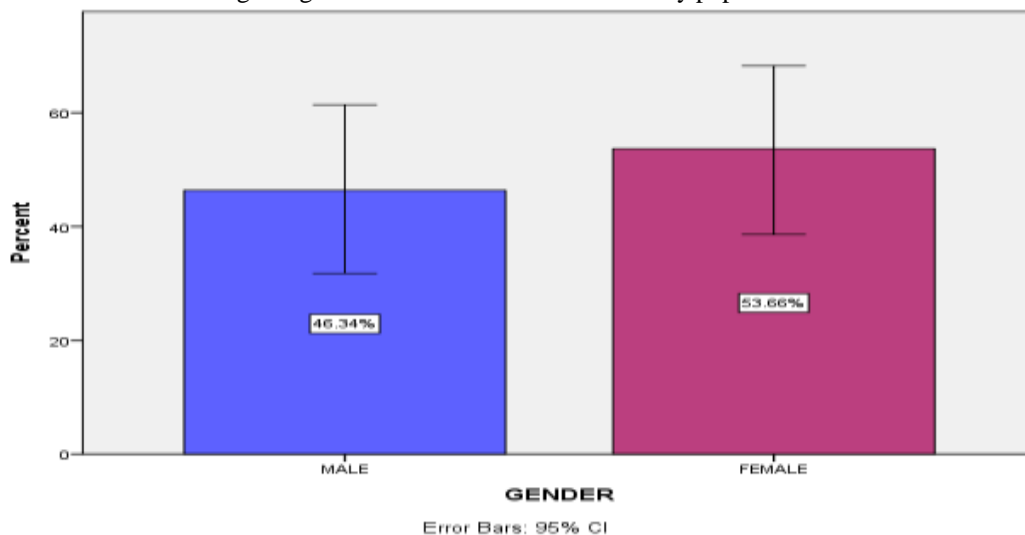


Fig. 2 - the location/ surgical site of the OGS.

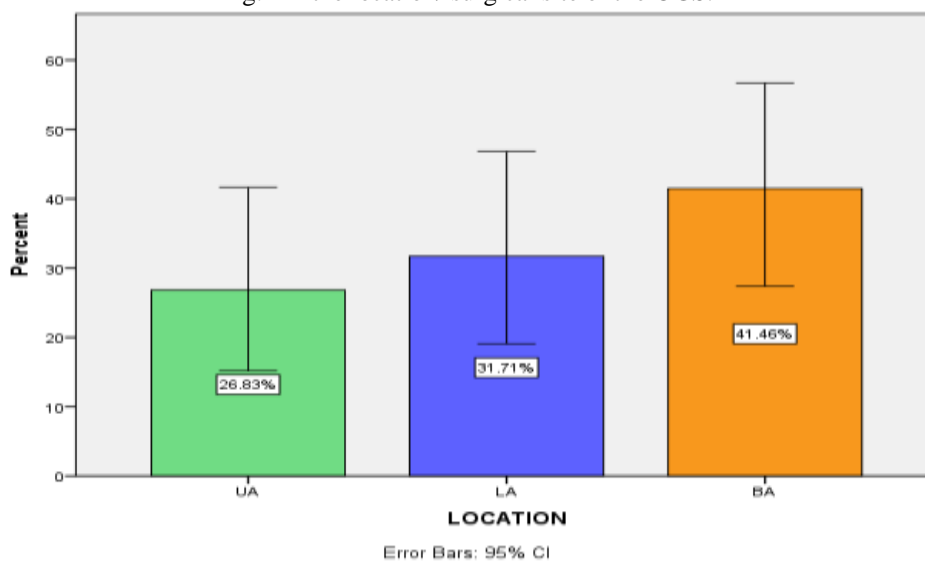
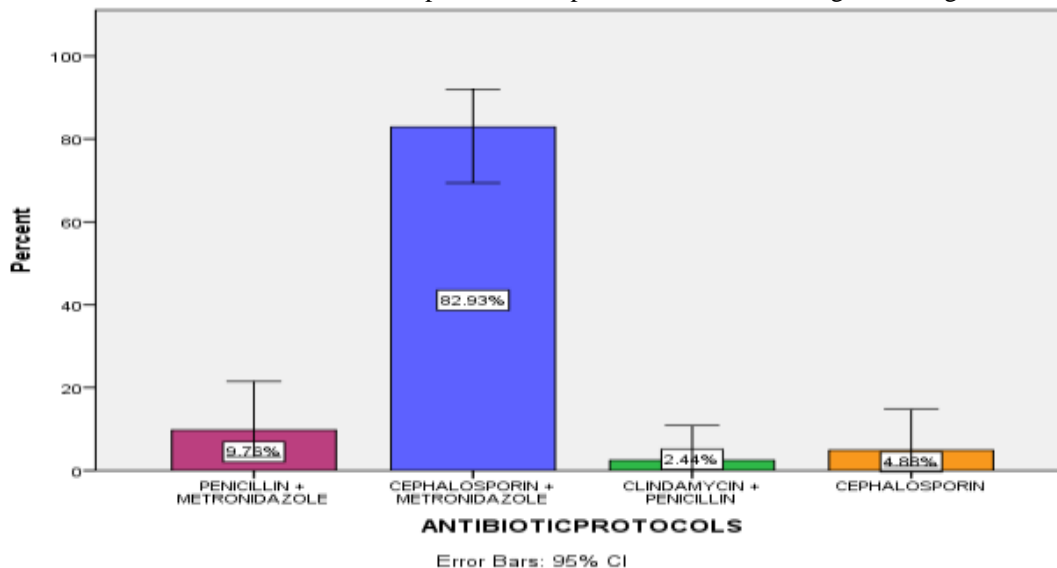


Fig. 3 - antibiotic/combination of antibiotics prescribed to patients who have undergone orthognathic surgery.



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