PalArch's Journal of Archaeology of Egypt / Egyptology

AWARENESS ON MANAGEMENT OF OSTEOSARCOMA OF JAW AMONG DENTAL STUDENTS- A QUESTIONNAIRE STUDY

GodlinJeneta J[1], *Dhanraj Ganapathy*[2*], *Subhashree R*[3]

[1]Saveetha Dental College and Hospitals,Saveetha Institute of Medical and Technical Sciences,Saveetha University, Chennai – 77, Email: 151501020.sdc@saveetha.com

[2*]Professor and Head,Department of Prosthodontics,Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 77. Email:dhanraj@saveetha.com, Phone: 9841504523

[3]Senior Lecturer,Department of Prosthodontics,Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 77. Email:subhashreer.sdc@saveetha.com

Godlin Jeneta J, Dhanraj Ganapathy*, Subhashree R. AWARENESS ON MANAGEMENT OF OSTEOSARCOMA OF JAW AMONG DENTAL STUDENTS-A QUESTIONNAIRE STUDY--Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7), 1008-1018. ISSN 1567-214x

Keywords: Chemotherapy; Osteosarcoma of Jaw; Radical resection; Radiotherapy;

ABSTRACT

Osteosarcoma are rare and malignant, bone tumors. Osteosarcoma of bones are extremely rare and represents 7% of all sarcoma and 1% of all head and neck tumors. The aim of this questionnaire study is to estimate the awareness on management of osteosarcoma of jaws among dental school students. An online questionnaire consisting of 10 questions eliciting the information regarding awareness on management of osteosarcoma of jaws were formulated and circulated among the dental students in a University setting. Data collected were tabulated and assessed using SPSS software. Study showed that 35% of the participants were not aware about the management of osteosarcoma of jaw. As dentists it is important to know the management, treatment options available and complications of osteosarcoma of jaw. In this study we could see that the participants' knowledge about management of osteosarcoma of jaws was less adequate. Many participants were not aware about the treatment modalities. Proper training and conferences should be conducted to elicit their knowledge.

INTRODUCTION

Osteosarcoma is one of the most common malignancies of bone. It accounts for almost 40 to 50% of all malignancies of bone (1). Iot is seen mostly in faster growing bones. Osteosarcoma of jaws are extremely rare, seen about 7% all osteosarcomas and 1% of malignancies of the head and neck (2)(3). Both maxilla and mandible are equally affected and seen mostly in males than in females (4). Microscopically, 50% 0f osteosarcoma of jaw are chondroblastic (minimal production of osteoid matrix) or osteoblastic (more production of osteoid matrix) (5)(6). These are classified into two types. Primary for which the etiology is unknown and may be caused due to genetic predisposition. Secondary, it occurs in the older patients with underlying diseases such as paget's, fibrous dysplasia and as a late sequelae of craniofacial irradiation (7)(4).

Etiological factors such as genetic mutation of P53 (Tumor suppressor gene) and mutated retinoblastoma gene are claimed to cause osteosarcoma of jaws. This peaks one or two decades after adolescence which excludes rapid growth of bone as the etiological factor (8).

Factors affecting the prognosis of osteosarcomas include histological subtype, tumor grade, size, age of the patient and response to chemotherapy. These have distinct features such as older age presentation, rare distant metastases, longer median survival, local recurrence, difficult to control and leading to death (9). The grading is divided into low grade (G1) and high grade (G2). The extent is classified into intracompartmental (T1), which is placed in a particular location or extracompartmental (T2), which involves the adjacent structures. Metastasis is classified into M0, and has not spread to the lymph nodes or other organs and M1 where metastasis occurred.

Radical resection is the treatment of choice for osteosarcoma of the jaw. Surgery and adjuvant chemotherapy is required based on the presence of micrometastasis. Maxillectomy is difficult to perform due to the presence of adjacent structures. A subtotal inferior maxillectomy in selected sites are described (10). Obturators have been prescribed for the defects created. Three classes of obturators are surgical, post surgical and definitive obturators.

Prognosis of individuals with metastasis is determined based on the site, number of metastasis and the surgical resectability of metastatic disease. Individuals with unilateral pulmonary metastasis rather than bilateral and individuals with fewer nodules have favourable prognosis. Patients with multifocal osteosarcoma have poor prognosis. Patients with skip metastasis seem to have inferior prognosis (11),(8) .

Previously our department has published extensive research on various aspects of prosthetic dentistry (12–22), this vast research experience has inspired us to research about the awareness on management of osteosarcoma of the jaw among the dental students.

MATERIALS AND METHODS

The setting was an online University setting. The advantage of this questionnaire study was versatile distribution, rapid collection of response and the disadvantage was dishonest answers from few participants. Ethical approval was obtained from the institution's ethical committee. The number of people involved in this study includes guide, reviewer and principle investigator.

A structured self assessed online questionnaire having 10 questions on awareness of management of osteosarcoma of jaw was prepared with the aim to assess the awareness among dental students. Sampling was done by convenient sampling. Undergraduate dental students with clinical exposure in a single university setting were included in this study. Students without clinical exposure were excluded from the study.

The questionnaires were distributed to the 100 dental students who have clinical exposure including 3rd BDS, final BDS, interns. The questionnaire was validated and reviewed before circulating to the participants. The study was done in a university setting. It was circulated using an online search software, survey planet and the response was collected through it. The results were transferred to SPSS. Response for each question was represented in the pie chart.

Statistical analysis was done using SPSS software (IBM SPSS Statistics 26.0). Descriptive statistics such as frequency distribution was used in data analysis. Frequency distribution of each response among the dental students was done.

QUESTIONNAIRE

1. Year of study
2. Do you know about the management of osteosarcoma of the jaw?
3. Which of the following is the effective treatment of osteosarcoma of jaw?
4. Which of the following causes failure of treatment of osteosarcoma of the jaw?
5. Osteosarcoma in which of the jaw is easiest to operate?
6. Management of Low grade osteosarcoma can be relied on?
7. Management of high grade osteosarcoma can be relied on?
8. Most utilised flap in mandibular reconstruction?
9. Why is Digital Imaging and COmmunication in Medicine (DICOM) used?
10. When should a definitive obturator be placed?

RESULTS AND DISCUSSION

This study was conducted among 100 dental students. Out of 100, 34% were 3rd year undergraduate students, 25% were 4th year undergraduate students and 41% were interns (figure 1). 65% of the participants responded that they knew about the management of osteosarcoma of jaw while 35% were not aware (figure 2). 45% of the participants answered that surgical recession was

the effective treatment for management of osteosarcoma of jaw while 13% responded chemotherapy, 17% responded as radiotherapy and 25% as not sure (figure 3). Early diagnosis and complete tumor resection are said to be the most important factors to achieve better prognosis of osteosarcoma of jaw (23).

49% answered that incomplete tumor resection was the cause for failure of treatment of osteosarcoma of jaw while 14% responded as age group, 11% as metastasis and 26% as not sure (figure 4). Obtaining disease free margins is the primary goal while it is difficult in head and neck osteosarcoma. Because of the anatomical complexity, complete resection is occasionally not possible causing local recurrence and intracranial invasion and is reported as the major cause for failure of treatment (24).

45% of the participants answered that osteosarcoma in the mandible was the easiest to operate while 8% maxilla, 15% both arch and 32% were not sure (figure 5). Lower jaw resections are considered to be the easiest due to restricted growing patterns of tumor patterns and less fundamental structures compared to maxilla (1).

39% of the participants answered that the management of low grade osteosarcoma can be relied solely on surgery alone while 15% answered as radiotherapy alone, 12% responded as chemotherapy alone, 13% responded as surgery along with chemotherapy or radiotherapy and 21% were not sure (figure 6). 39% of the participants answered that the management of high grade osteosarcoma should be relied on surgery along with chemotherapy or radiotherapy while 16% answered as radiotherapy alone, 10% responded as chemotherapy alone, 12% responded as surgery alone and 23% were not sure (figure 7). For small low grade osteosarcomas the best treatment is resection alone and for high grade osteosarcomas multimodal therapy can be advised. Adding radiotherapy and chemotherapy has demonstrated increased survival rate in locoregionally advanced cancer of head and neck. Guadagnola et al studied the role of radiotherapy in multimodal treatment and stated that combined use of surgery and radiotherapy was superior to surgery alone (25). High Risk group is said to provide better results.

48% of the participants responded as fibula flap was the most utilised flap in mandibular reconstruction while 13% responded as radial forearm flap with partial radius inclusion, 11% as scapular osteocutaneous flap and 28% as not sure (figure 8). Fibula flap is the most used in mandibular reconstruction due to its high rate of success and low rate of complication in donor and recipient sites (1).

30% of the participants answered that Digital Imaging and COmmunication in Medicine (DICOM) was used for precise excision of tumor while 13% answered as optimal marginal control, 13% answered as diagnosis and 44% as not sure (figure 9). DICOM allows tailored surgical cutting guides to help precise excision of tumor (26). Optimal margin can be achieved by using intraoperative image guided navigation systems (27). These technologies are used when dealing with the malignancies of upper jaw allowing careful three

dimensional tumor resection planning.
37% answered that a definitive obturator is placed 3 to 12 months post surgerywhile 14% answered during surgery, 15% answered before 3 months and 34% were not sure (figure 10). Three types of obturators are available for management of defects created during surgery. Surgical obturators are placed during the time of surgery. Post surgical obturators are prosthesis that are placed after removal of packing, until tissue contracture and are placed prior to definitive obturators. Definitive obturators are placed after the site of surgery become stable. Approximately 3 to 12 months post surgery(28).

Limitations of the study includes dishonest answers in questionnaires by respondents and usage of a single online survey platform in a single university setting. Future study should aim at conducting surveys using multiple online survey platforms to include more participants in different university settings.

CONCLUSION

Survival of patients with osteosarcoma of jaw has improved greatly due to various management strategies. In this study we can conclude that the awareness on management of osteosarcoma of jaw is less adequate. Knowledge of pathways involved in sarcogenesis is lacking among the denta;l students. It is important to know about the recent advances, their complications to manage these patients.

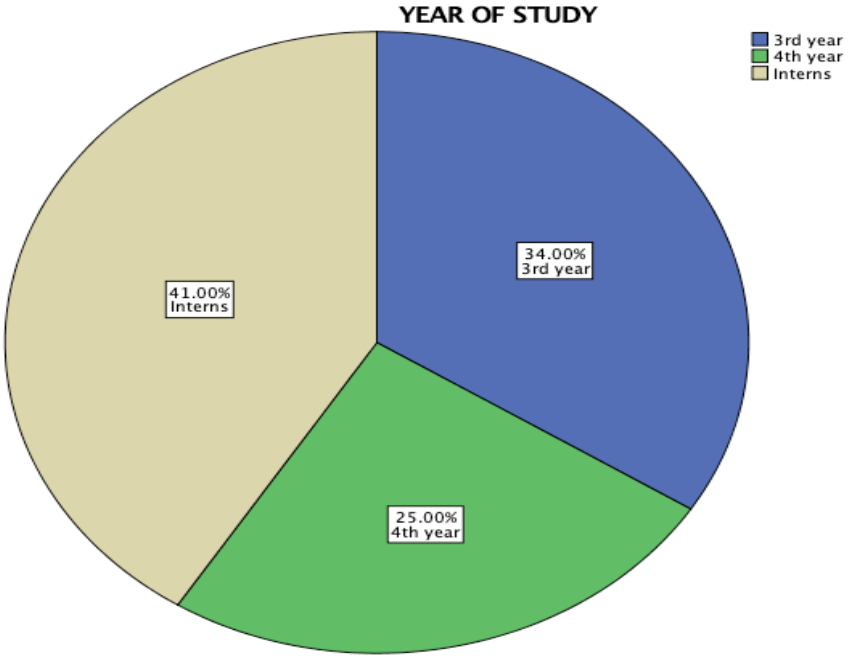

Figure 1 reveals the year of study of the students who responded to the questionnaire study. 34% of the participants were 3rd years, 25% were 4th years and 41% were interns.

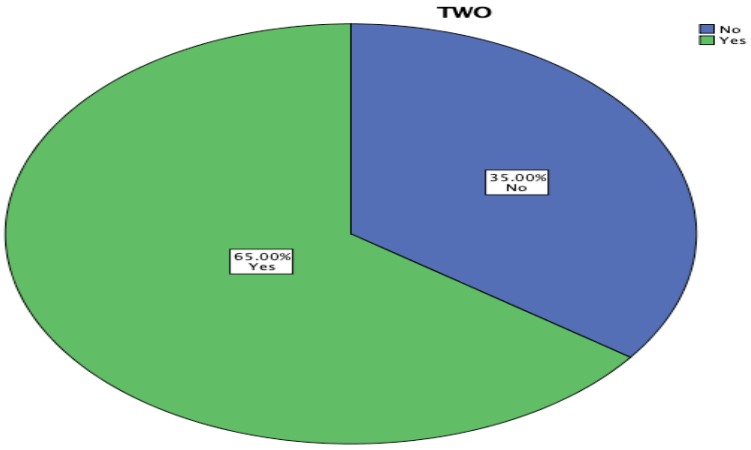

Figure 2 reveals the responses received from participants for the question, Do you know about the management of osteosarcoma of the jaw? 65% of the participants answered yes and 35% answered no.

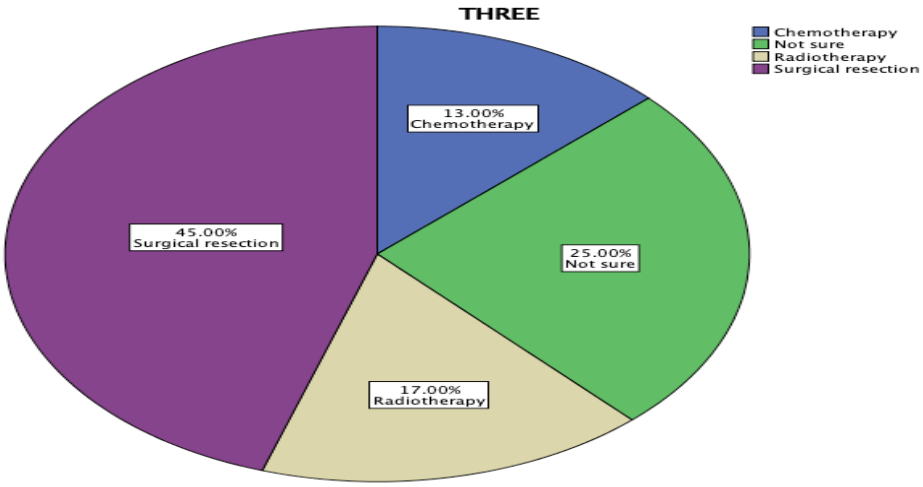

Figure 3 reveals the responses received from participants for the question, Which of the following is the effective treatment of osteosarcoma of jaw? 45% answered surgical recession which is the correct answer.

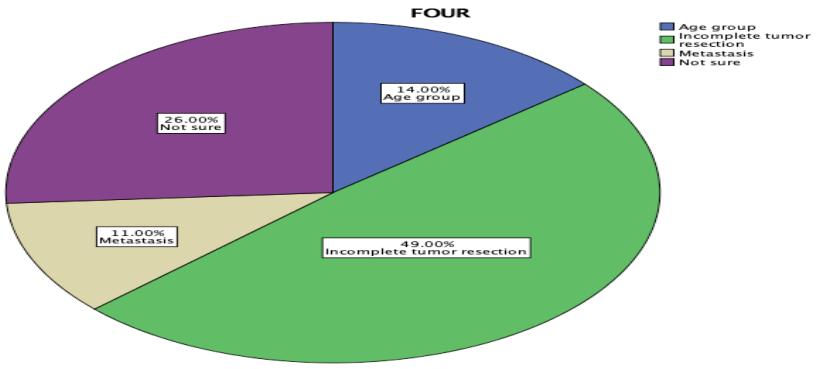

Figure 4 reveals the responses received from participants for the question, Which of the following causes failure of treatment of osteosarcoma of the jaw? 49% answered incomplete tumor resection which is the correct answer.

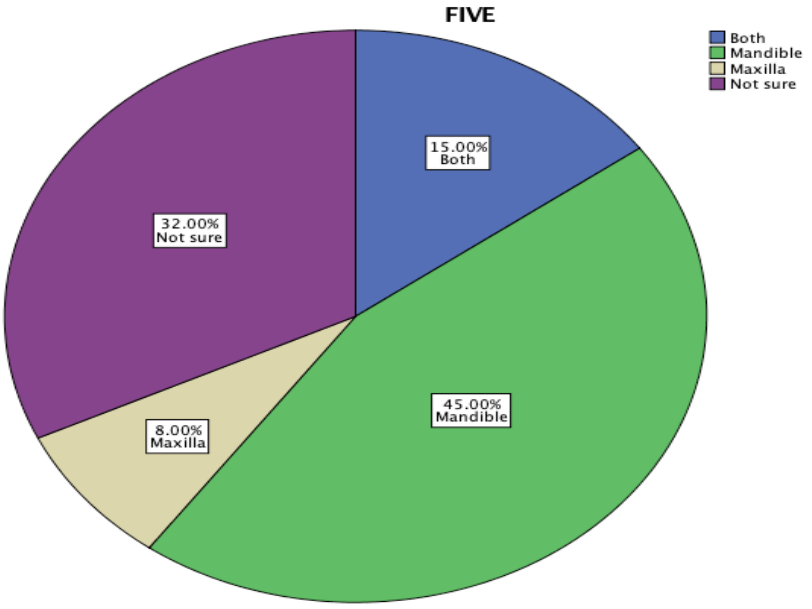

Figure 5 reveals the responses received from participants for the question, Osteosarcoma in which jaw is the easiest to operate? 45% answered mandible which is the correct answer.

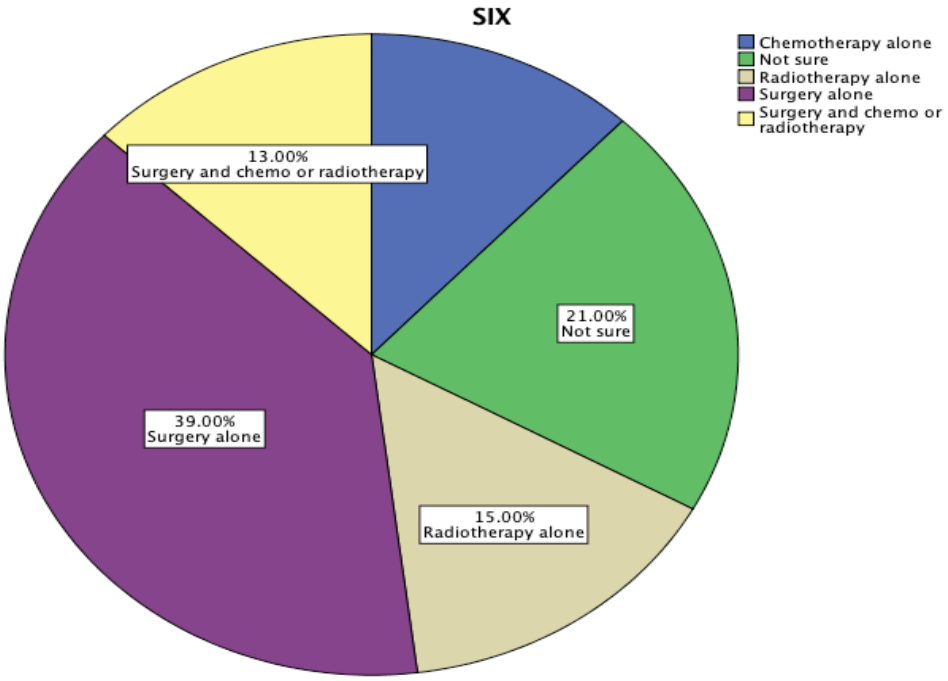

Figure 6 reveals the responses received from participants for the question, Management of Low grade osteosarcoma can be relied on? 39% answered surgery alone which is the correct answer.

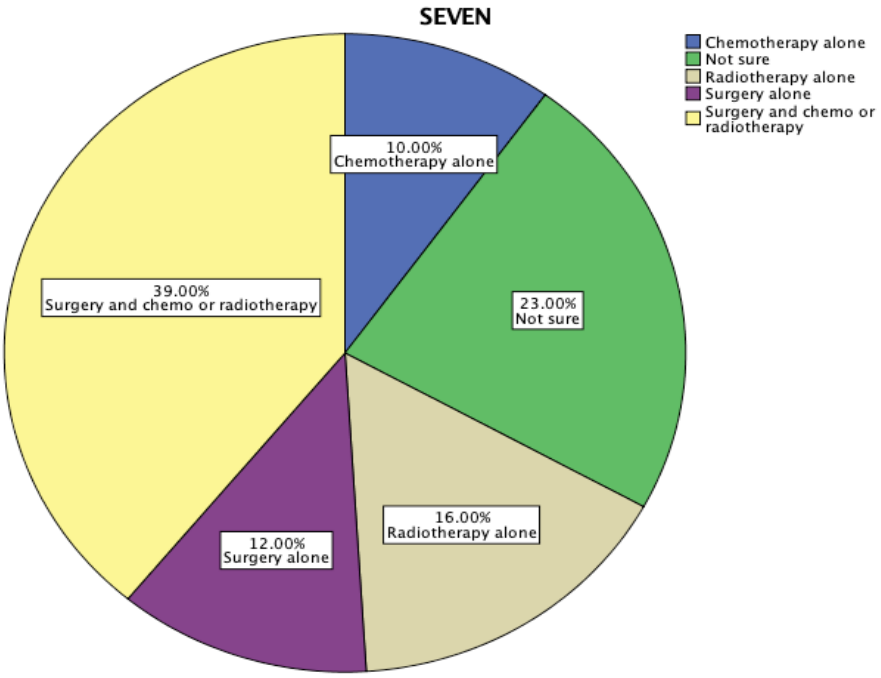

Figure 7 reveals the responses received from participants for the question, Management of high grade osteosarcoma can be relied on? 39% answered surgery along with chemo or radiotherapy which is the correct answer.

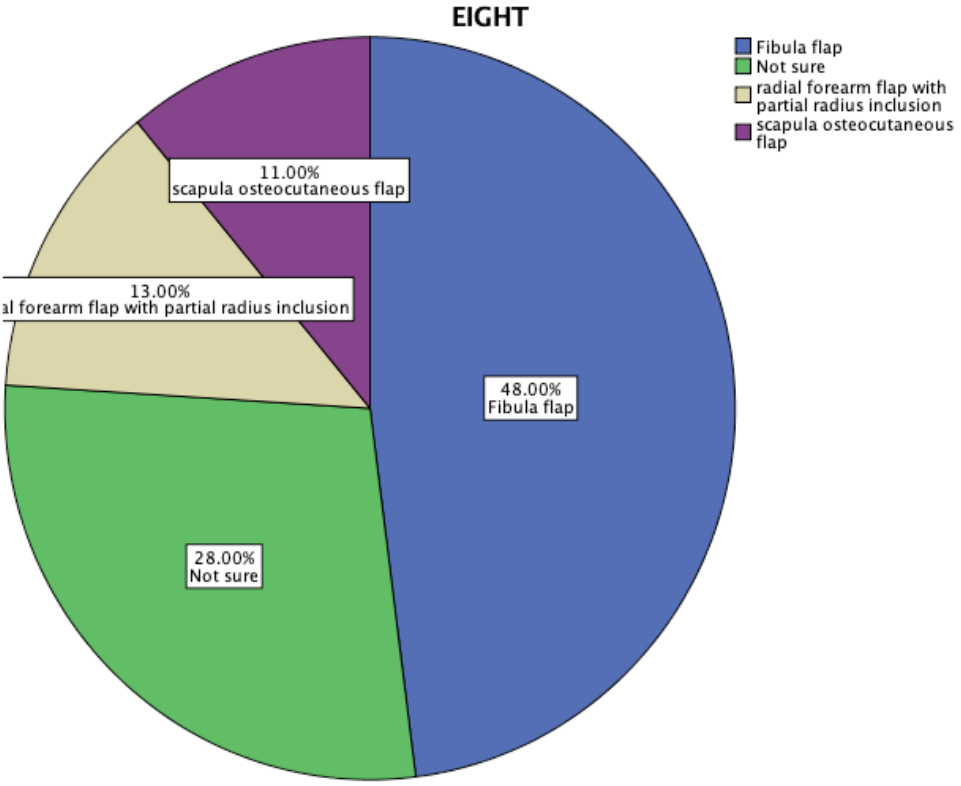

Figure 8 reveals the responses received from participants for the question, Mostutilised flap in mandibular reconstruction? 48% answered fibula flap which is the correct answer.

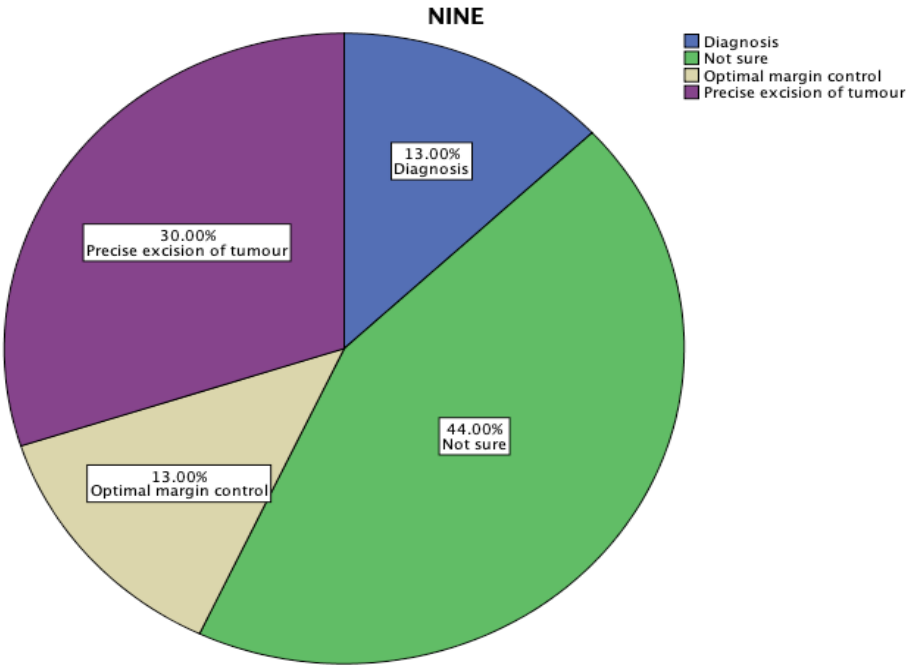

Figure 9 reveals the responses received from participants for the question, Why is Digital Imaging and COmmunication in Medicine (DICOM) used? 30% answered precise excision of tumor which is the correct answer.

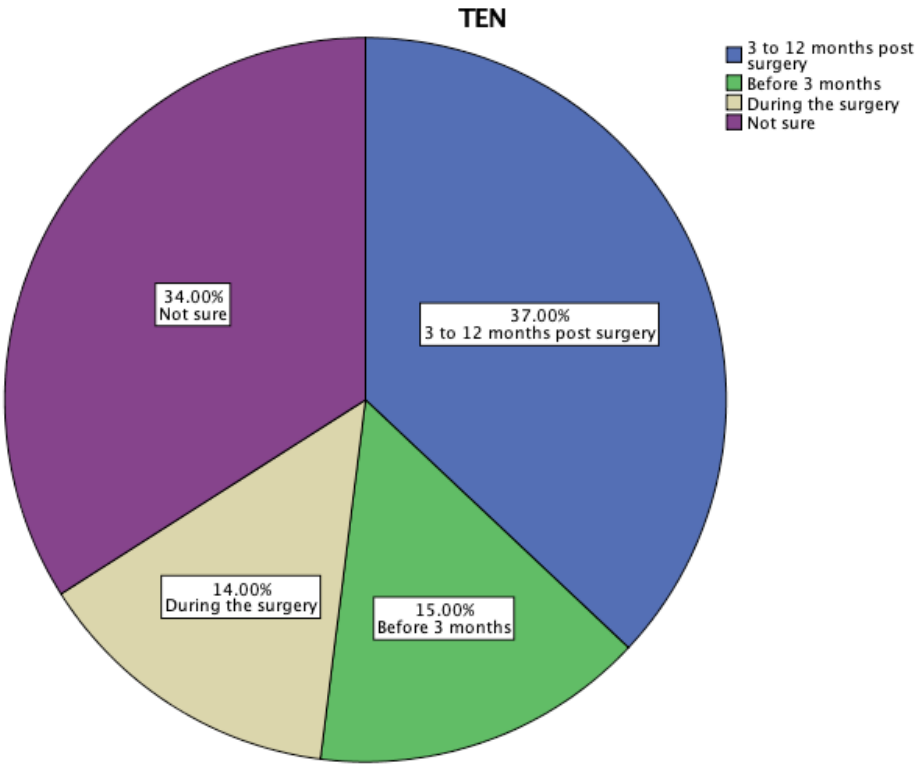

Figure 10 reveals the responses received from participants for the question, When should a definitive obturator be placed? 37% answered 3 to 12 month post surgery which is the correct answer.

REFERENCES

1. Ferrari D, Moneghini L, Allevi F, Bulfamante G, Biglioli F. Osteosarcoma of the Jaw: Classification, Diagnosis and Treatment. Osteosarcoma: Biology, Behavior and Mechanisms. 2017;197.
2. Campanacci M. Metastatic Bone Disease. In: Campanacci M, editor. Bone and Soft Tissue Tumors: Clinical Features, Imaging, Pathology and Treatment. Vienna: Springer Vienna; 1999. p. 755–87.
3. Dahlin DC. UKK. Osteosarcoma bone tumors CC Thomas, Springfield. 1986;
4. August M, Magennis P, Dewitt D. Osteogenic sarcoma of the jaws: factors influencing prognosis. Int J Oral Maxillofac Surg. 1997 Jun 1;26(3):198–204.
5. Nakayama E, Sugiura K, Kobayashi I, Oobu K, Ishibashi H, Kanda S. The association between the computed tomography findings, histologic features, and outcome of osteosarcoma of the jaw. J Oral Maxillofac Surg. 2005 Mar 1;63(3):311–8.
6. Clark JL, Unni KK, Dahlin DC, Devine KD. Osteosarcoma of the jaw. Cancer. 1983;51(12):2311–6.
7. Klein MJ, Siegal GP. Osteosarcoma: anatomic and histologic variants. Am J ClinPathol. 2006;125(4):555–81.
8. Chaudhary M, Chaudhary SD. Osteosarcoma of jaws. J Oral MaxillofacPathol. 2012;16(2):233.
9. Forteza G, Colmenero B, López-Barea F. Osteogenic sarcoma of the maxilla and mandible. Oral Surg Oral Med Oral Pathol. 1986 Aug 1;62(2):179–84.
10. Pogrel MA. Inferior hemi-maxillectomy for treatment of palatal tumors. J Oral Maxillofac Surg. 1988 Jan 1;46(1):85–7.
11. Sajadi KR, Heck RK, Neel MD, Rao BN, Daw N, Rodriguez-Galindo C, et al. The Incidence and Prognosis of Osteosarcoma Skip Metastases. ClinOrthopRelat Res. 2004 Sep;426:92.
12. Anbu RT, Suresh V, Gounder R, Kannan A. Comparison of the Efficacy of Three Different Bone Regeneration Materials: An Animal Study. Eur J Dent. 2019 Feb;13(1):22–8.
13. Ashok V, Ganapathy D. A geometrical method to classify face forms. J Oral BiolCraniofac Res. 2019 Jul;9(3):232–5.
14. Ganapathy DM, Kannan A, Venugopalan S. Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis. World Journal of Dentistry. 2017;8(6):496–502.
15. Jain AR. Clinical and Functional Outcomes of Implant Prostheses in Fibula Free Flaps. World Journal of Dentistry. 2017 Jun;8(3):171–6.
16. Ariga P, Nallaswamy D, Jain AR, Ganapathy DM. Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review. World Journal of Dentistry. 2018 Feb;9(1):68–75.
17. Evaluation of Corrosive Behavior of Four Nickel–chromium Alloys in Artificial Saliva by Cyclic Polarization Test:An in vitro Study. World Journal of Dentistry. 2017;8(6):477–82.
18. Ranganathan H, Ganapathy DM, Jain AR. Cervical and Incisal Marginal Discrepancy in Ceramic Laminate Veneering Materials: A SEM Analysis.

ContempClin Dent. 2017 Apr;8(2):272–8.
19. Jain AR. Prevalence of Partial Edentulousness and Treatment needs in Rural Population of South India. World Journal of Dentistry. 2017 Jun;8(3):213–7.
20. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, NavarasampattiSivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. Implant Dent. 2019 Jun;28(3):289–95.
21. Gupta P, Ariga P, Deogade SC. Effect of Monopoly-coating Agent on the Surface Roughness of a Tissue Conditioner Subjected to Cleansing and Disinfection: A Contact Profilometric Study. ContempClin Dent. 2018 Jun;9(Suppl 1):S122–6.
22. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. J Dent Educ. 2019 Apr;83(4):445–50.
23. Russ JE, Jesse RH. Management of osteosarcoma of the maxilla and mandible [Internet]. Vol. 140, The American Journal of Surgery. 1980. p. 572–6. Available from: http://dx.doi.org/10.1016/0002-9610(80)90215-9
24. Spires JR, Schwartz MR, Miller RH. Anaplastic Thyroid Carcinoma: Association With Differentiated Thyroid Cancer [Internet]. Vol. 114, Archives of Otolaryngology - Head and Neck Surgery. 1988. p. 40–4. Available from: http://dx.doi.org/10.1001/archotol.1988.01860130044012
25. Guadagnolo BA, Ashleigh Guadagnolo B, Zagars GK, Kevin Raymond A, Benjamin RS, Sturgis EM. Osteosarcoma of the jaw/craniofacial region [Internet]. Vol. 115, Cancer. 2009. p. 3262–70. Available from: http://dx.doi.org/10.1002/cncr.24297
26. Coppen C, Weijs W, Bergé SJ, Maal TJJ. Oromandibular Reconstruction Using 3D Planned Triple Template Method. J Oral Maxillofac Surg. 2013 Aug 1;71(8):e243–7.
27. Yu H, Wang X, Zhang S, Zhang L, Xin P, Shen SG. Navigation-guided en bloc resection and defect reconstruction of craniomaxillary bony tumours. Int J Oral Maxillofac Surg. 2013 Nov 1;42(11):1409–13.
28. Taylor TD. Clinical Maxillofacial Prosthetics. Quintessence Publishing Company; 2000. 304 p.