PalArch's Journal of Archaeology of Egypt / Egyptology

KNOWLEDGE AND AWARENESS OF DIFFERENT TYPES OF OCCLUSION SCHEMES IN COMPLETE DENTURE AMONG SECOND YEAR STUDENTS - A SURVEY

Twinkle Francis[1], Dr.Venkatesh Kommi[2], Dr. Keerthi Sasank[3], A.K Anjali[4]

[1]Saveetha Dental College,Saveetha Institute of Medical and Technical Sciences, Saveetha University,Chennai 600077, Tamil Nadu, India

[2]Senior Lecturer, Department of Prosthodontics,Saveetha Dental College,Saveetha Institute of Medical and Technical Sciences, Saveetha University,162, Poonamallee high road,Chennai 600077Tamil Nadu, India

[3]Senior Lecturer,Department of ProsthodonticsSaveetha Dental College,Saveetha Institute of Medical and Technical Sciences, Saveetha University,Chennai 600077, Tamil Nadu, India

[4]Lecturer, Department of General Pathology,Saveetha Dental College,Saveetha Institute of Medical and Technical SciencesSaveetha university,Chennai 600077,Tamil Nadu, India

[1]151801021.sdc@saveetha.com,[2]venkateshk.sdc@saveetha.com[3]keerthis.sdc@saveetha.com ,[4]anjaliak.sdc@saveetha.com

JTwinkle Francis, Dr.Venkatesh Kommi, Dr. Keerthi Sasank, A.K Anjali.KNOWLEDGE AND AWARENESS OF DIFFERENT TYPES OF OCCLUSION SCHEMES IN COMPLETE DENTURE AMONG SECOND YEAR STUDENTS - A SURVEY--Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7), 3441-3457. ISSN 1567-214x

Keywords: Awareness, complete denture, occlusal scheme, second year students.,.

ABSTRACT

'Occlude' means to 'close' and occlusion is defined as the static relationship between the incising or masticatory surface of the maxillary or mandibular teeth or tooth analogues. It is necessary to plan out the occlusal scheme prior to selection and arrangement of artificial teeth.Out of the many concepts which were proposed, balanced occlusion, canine guided occlusion, lingualized occlusion and monoplane occlusion are used most commonly. The aim of this study is to assess the knowledge, awareness and practise of occlusal schemes in complete dentures among second year students. A questionnaire was prepared with general questions based on the occlusal schemes of complete dentures and was distributed among a total of 100 practising in their second year. The data which was collected were computerised and analysed statistically using the SPSS software. The results showed that 89.8 students

were aware that the occlusal scheme required for complete denture is balanced occlusion, 59.3% agreed upon use of lingualized teeth to establish balanced occlusion and 71.2% of students were aware about the denture instability cause as underextension. By result analysis, it was observed that the awareness regarding occlusal schemes could improve more among second year students.

INTRODUCTION

Several concepts were developed to achieve balanced occlusion with their merits and demerits. Complete denture occlusion is a part of the stomatognathic system and not just arrangement of maxillary and mandibular teeth (Cameron, 2004). The foremost concern being health and preservation of all the supporting structures. All the factors such as biological, physiological, mechanical, etc that favour the stability of the denture base and help avoid excessive force transmission must be considered (Ganapathy *et al.*, 2016). Occlusal scheme by definition is defined as the form of arrangement of occlusal contacts in the natural and artificial teeth and hence the chosen occlusal scheme will determine the pattern of occlusal contacts between the opposing teeth during centric relation as well as the mandible movements (Subasree, Murthykumar and Dhanraj, 2016).

Out of the many concepts which were proposed, balanced occlusion, canine guided occlusion, lingualized occlusion and monoplane occlusion are used most commonly (Jain, Ranganathan and Ganapathy, 2017). Balanced occlusion is the realisation of tooth contacts on the working side as well as the balancing side at the same time (Ariga *et al.*, 2018). Occlusal rehabilitation in complete dentures falls under four main occlusal concepts: unbalanced articulation, balanced articulation and lingualized articulation (Jyothi *et al.*, 2017).

Among the proposed concepts to attain balanced occlusion, in 1914, Gysi's concept had emerged and he gave an inclination of 33° to cuspal inclines (cuspal form) in order to synchronise them with the condylar inclination of 33° to horizontal(Neto, Junior and da Fonte Porto Carreiro, 2010). In centric occlusion, masticatory forces are directed to the ridges and in the right lateral position, the occlusal contact forces are to act away from the ridges (Duraisamy *et al.*, 2019).

Sears (Sears, 1937), in 1922, with his chewing members and 1927 with channel teeth (Ajay *et al.*, 2017), both being non anatomic teeth has used a second molar ramp to develop balanced occlusion bh a curved occlusal plane both antero posteriorly and laterally.

In 1925, Rudolph L Hanau (Hanau, 1926) published a paper titled 'Articulation: Defined, analysed and formulated' in which he discussed his belief that articulation of artificial teeth are related to nine factors charted mathematically and listed the laws of balanced occlusion in 44 statements(Hanau, 1929). Later, Theilmann (Kawano *et al.*, 1996) simplified Hanau's factors as a formula for balanced articulation. It was KxI/OPxCxOK where 'K' stands for condylar guidance,'I' stands for incisal guidance,'OP' stands for occlusal plane, 'C' stands for cuspal inclination, 'OK' stands for curvature of the occlusal surfaces(Deniz and Kulak Ozkan, 2013).

Just like every occlusal concept, balanced occlusal contacts have few disadvantages too because it is difficult to achieve in mouths where an

increased vertical incisor overlap is present – Class II cases (Dl and Sarandha, 2007). It may be prone to encourage lateral and protrusive grinding habits. A semi adjustable or fully adjustable articulator would be required in that case (Collett, 1955). Although advantages being preserving the stability of complete denture, chewing function and decreasing active loading of supporting tissue (Selvan and Ganapathy, 2016). The aim of this study is to determine the knowledge, attitude and practise of occlusal schemes in complete dentures among general second year students.

MATERIALS AND METHODS

A total of 100 questionnaires were distributed among 100 students studying their second year of BDS in different colleges in Chennai. The questionnaire included questions regarding preference of occlusal schemes to be provided in complete denture, The data was collected and were analysed statistically using SPSS software. Statistical analysis was done wherein the collected data was computerised and analysed with IBM SPSS software (version 23.0) The software helps to describe the data and provide descriptive statistics, frequencies and percentage analysis for categorical variables and SD was used for continuous variables to find significant difference between the bivariate samples of independent groups.

Table 1 shows the list of questions in the questionnaire that was distributed among students.

RESULTS AND DISCUSSION

After the distribution of 100 questionnaires and obtaining the analysed data, the results were obtained as shown below (Figures 1-11).

71.2% of the respondents chose underextension, 16.1% of the students chose processing errors, 7.6% chose premature contacts and 5.1% responded to gravity as the cause for denture instability (as shown in figure 1). 89.8% of the respondents chose balanced occlusion, 5.9% of them chose mutually protected occlusion, 2.5% chose myocentric occlusion and 1.7% of the respondents chose occlusal ramps as the preferred occlusal scheme for complete denture (as shown in figure 2). 80.5% of the students chose peripheral seal, 10.2% picked adhesion, 5.9% of the students chose roots and 3.4% of the students chose gravity as the mode of retention for a complete denture (as shown in figure 3). 58.6% of students picked Christenson's phenomenon, 28% of students picked Hanau's phenomena, 8.5% of them chose Jorgenson's phenomena and 5.9% picked Zuckerberg's phenomena as the phenomena of denture tipping during protrusion (as shown in figure 4). 72.9% of the respondents chose protrusive record, 14.4% of the students chose centric record, 11% of students chose retrusive record and 1.7% students chose wax record as the required records to provide balanced occlusion (as shown in figure 5).

69.5% of the students responded Hanau's formula, 12.7% responded Bennet's formula, 11.9% responded Fischer's formula, 5.9% responded Bonwill's formula to how condylar guidance helps in establishing balance (as shown in

figure 6). 75.3% chose bilateral, simultaneous. 15.3% chise unilateral, simultaneous. 7.6% chose single point contact, 1.7% chose anterior contact as to what is present in balanced occlusion (as shown in figure 7). 72.9% of students picked eccentric relations, 11.9% of students chose jaw opening, 9.3% chose centric relation and 5.9% chose swallowing as the movement that prevents balanced contacts from tipping (as shown in figure 8). 70.3% of respondents responded that semi-adjustable articulators are required, 15.3% responded both fully adjustable and semi adjustable are required, 8.5% responded fully adjustable articulators are required and 5.9% of them responded non adjustable articulators are required (as shown in figure 9). 59.3% of students responded YES and 15.3% of students responded NO and 25.4% of students picked MAYBE as the option to whether balanced occlusion could be established using lingualized teeth (as shown in figure 10). 49.2% of students responded NO, 32.2% responded MAYBE and 18.6% of students responded YES as to whether balanced occlusion could be established with the use of monoplane teeth (as shown in figure 11).

When comparing the awareness of the primary cause of denture instability with gender, it was shown that females had a higher level of awareness about the primary cause of denture instability when compared to males (p=0.005), which was statistically significant (figure 12). When comparing the awareness of the occlusal scheme to be provided in a complete denture with gender, it was shown that females had a better knowledge about the occlusal scheme to be provided in a complete denture compared to the males (p = 0.521), which was statistically not significant (figure 13). When comparing the awareness of the mode of retention in a denture with gender, it was shown that females had a higher level of awareness of the mode of retention needed in a denture compared to the males involved in this survey (p=0.020), which was statistically significant (figure 14). When comparing the awareness of record needed to provide balanced occlusion with gender, it was shown that females had a higher level of knowledge when compared to the males involved in this survey (p=0.000) which was statistically significant (figure 15). When comparing the awareness of the kind of articulator required to establish balanced occlusion with gender, it was shown that females had a better knowledge about the kind of articulator required to establish balanced occlusion compared to the males (p = 0.000), which was statistically significant (figure 16).

Although complete dentures have been one of the most basic and common prosthodontic treatments, many basic and common prosthodontics treatments, many important concepts are variables that are not scientifically explained, validated or made understood to people and practitioners (Ganapathy, Kannan and Venugopalan, 2017),(Vijayalakshmi and Ganapathy, 2016).
The numerous challenges faced with the treatments of provided complete denture are lack of expertise related to high quality complete denture, larger proportion of elderly patients who require advanced care and treatment and specific guidelines supported by lack of sound evidence(Howell, 2004),(Sears, 1938).

According to a review published in 2013, Abduo J concluded that anatomical teeth arranged in conventional bilateral balanced occlusion (CBBO) or lingualized bilateral balanced occlusion (LBBO) are preferable to flat teeth arranged in monoplane occlusion which is mainly related to patient acceptance (Abduo, 2013),(Ashok and Suvitha, 2016)

In 1996, BR Lang discussed that the available research had not identified a superior tooth form or arrangement to fulfil the requirements of complete denture patients in all areas of comfort, aesthetic and functionality (Lang, 2004),(Ashok *et al.*, 2014). In his opinion, the concept of lingualized articulation using tooth molds, custom designed specifically, seemed to be the most logical approach in occlusal rehabilitation of edentulous patients(Venugopalan *et al.*, 2014).
In an article published by Loh and Levey, 2018, it was seen that it seemed patients preferred anatomic or semi anatomic teeth and that chewing efficiency with anatomic and modified teeth was better than with non anatomic teeth (Loh and Levey, 2018),(Basha, Ganapathy and Venugopalan, 2018).

He concluded that there isn't any one occlusal scheme that fits all patients in need of complete denture and there are many cases where more than one occlusal scheme may be adequate (Kannan and Venugopalan, 2018),(Jacobson and Krol, 1983).

Table 1. Questionnaire consisting of survey questions related to the awareness of occlusal scheme in complete dentures among second year students.

1. Email ID
2. Name
3. Age
4. Year and course of study
5. What is the primary cause of denture instability?
- Gravity
- Underextension
- Processing errors
- Premature contacts

6. What is the occlusal scheme to be provided in complete denture?
- Myocentric occlusion
- Balanced occlusion
- Mutually protected occlusion
- Occlusal ramps

7. What is the mode of retention of a complete denture?
- Roots
- Peripheral seal
- Adhesion
- Gravity

8. What is the phenomenon of denture tipping during protrusion known as?
- Jorgensen's phenomenon
- Christensen's phenomenon
- Hanau's phenomenon

- Zuckerberg's phenomenon

9. What kind of record would you need to provide balanced occlusion?

- Retrusive record
- Protrusive record
- Centric record
- Wax record

10. How does recording condylar guidance help in establishing balance?

- Hanau's formula
- Bennett's formula
- Fischer's formula
- Bonwill's formula

11. What kind of contacts are present in Balanced occlusion?

- Bilateral, simultaneous
- Unilateral, simultaneous
- Single point contact
- Anterior contact

12. During which movement would balancing contacts prevent tipping?

- Centric relation
- Eccentric relation
- Jaw opening
- Swallowing

13. What kind of articulators are required for establishing balanced occlusion?

- Fully adjustable
- Semi adjustable
- Non-adjustable
- Both (i) and (ii)

14. Can balanced occlusion be established using lingualized teeth?

- Yes
- No
- Maybe

15. Can balanced occlusion be established using monoplane teeth?

- Yes
- No
- Maybe

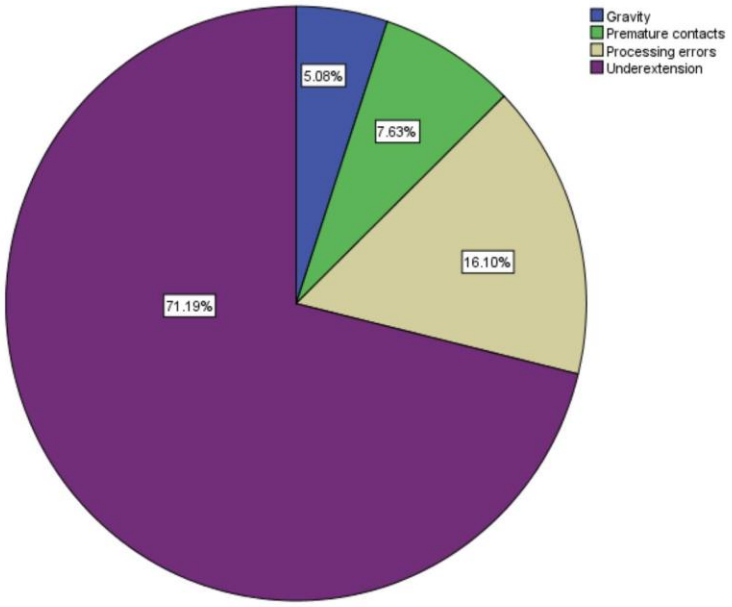

Figure 1. Pie chart showing the percentage of distribution of responses for the question, "What is the primary cause of denture instability?" where the majority of the respondents (71.19%, purple) responded underextension, (16.10%, yellow) responded processing errors, (7.63%, green) responded premature contacts and (5.08%, blue) responded gravity.

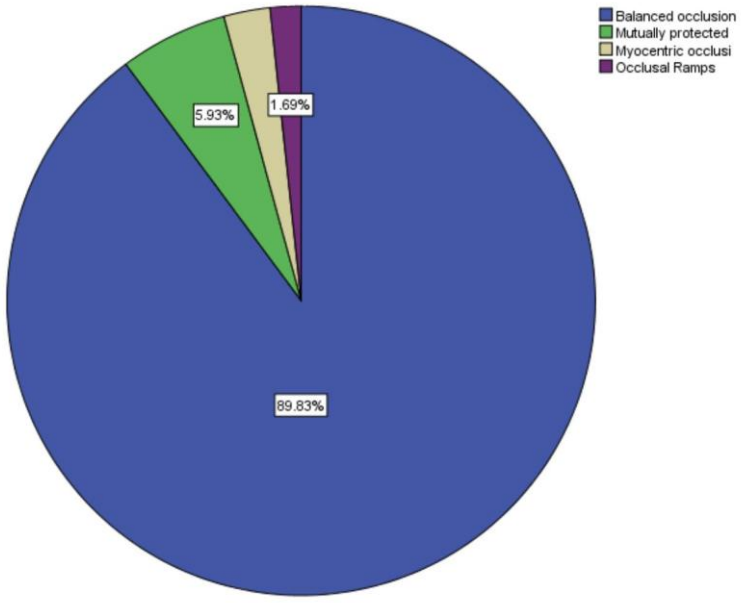

Figure 2. Pie chart showing the percentage of distribution of responses for the question, **"**What is the occlusal scheme to be provided in complete denture?" where the majority of the respondents (89.83%, blue) responded balanced occlusion, (5.93%, green) responded mutually protected occlusion, (1.69%, purple) responded occlusal ramps.

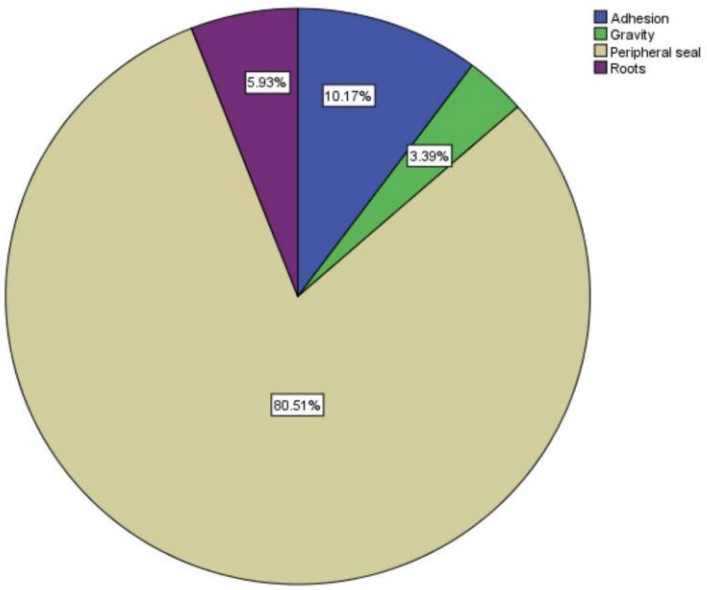

Figure 3. Pie chart showing the percentage of distribution of responses for the question, **"**What is the mode of retention of a complete denture?" where the majority of the respondents (80.51%, yellow) responded peripheral seal, (10.17%, blue) responded adhesion, (5.93%, purple) responded roots and (3.39%, green) responded gravity.

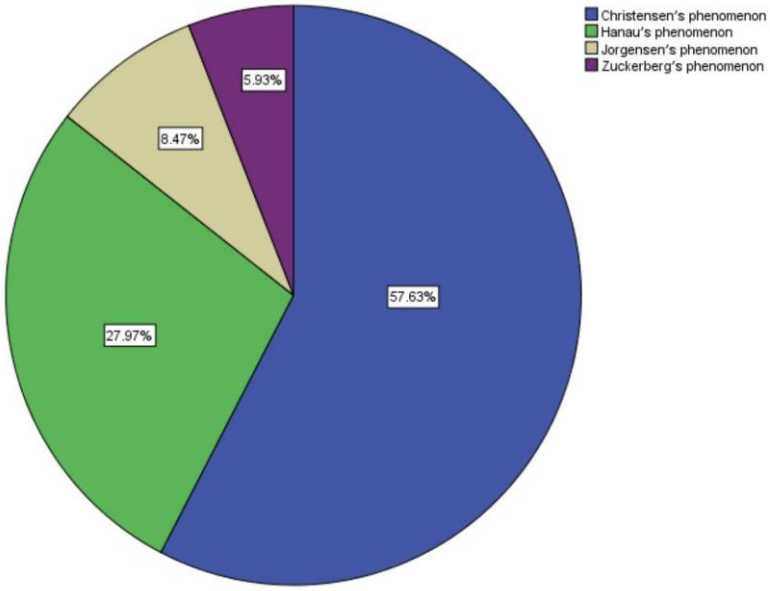

Figure 4. Pie chart showing the percentage of distribution of responses for the question, **"**What is the phenomenon of denture tipping during protrusion known as?" where the majority of the respondents (57.63%, blue) responded to christensen's phenomenon, (27.97%, green) responded to hanau's phenomenon, (8.47%, yellow) responded jorgensen's phenomenon and (5.93%, purple) responded zuckerberg's phenomenon.

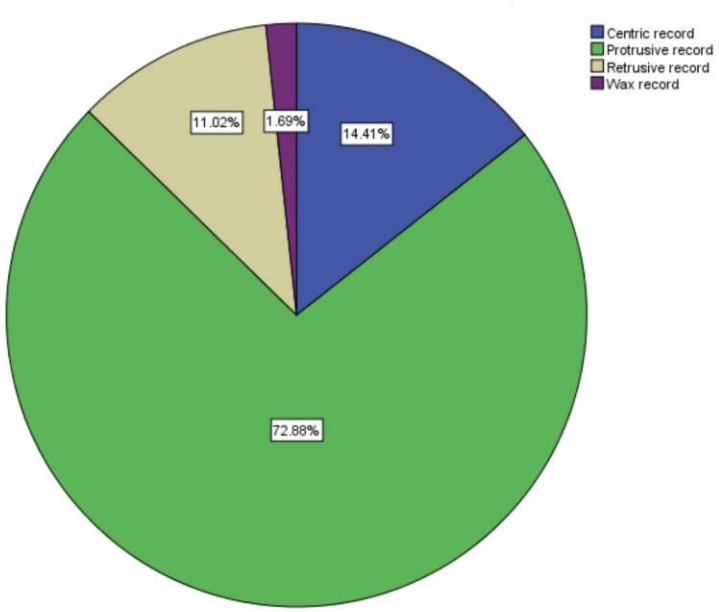

Figure 5. Pie chart showing the percentage of distribution of responses for the question, **"**What kind of record would you need to provide balanced occlusion?" where the majority of the respondents (72.88%, green) responded to protrusive record, (14.41%, blue) responded centric record, (11.02%, yellow) responded retrusive record and (1.69%, purple) responded wax record.

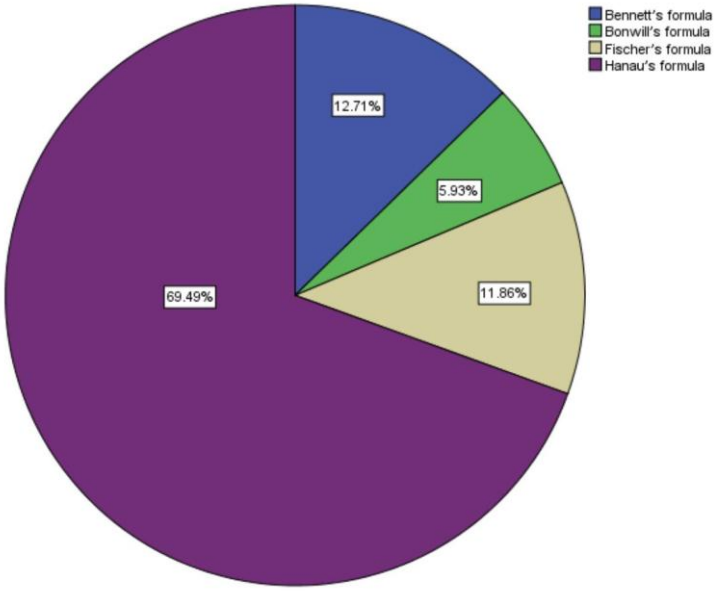

Figure 6. Pie chart showing the percentage of distribution of responses for the question, **"**How does recording condylar guidance help in establishing balance?" where the majority of the respondents (69.49%, purple) responded to hanau's formula, (12.71%, blue) responded bennett's formula, (11.86%, yellow) responded fisher's formula and (5.93%, green) responded bonwill's formula.

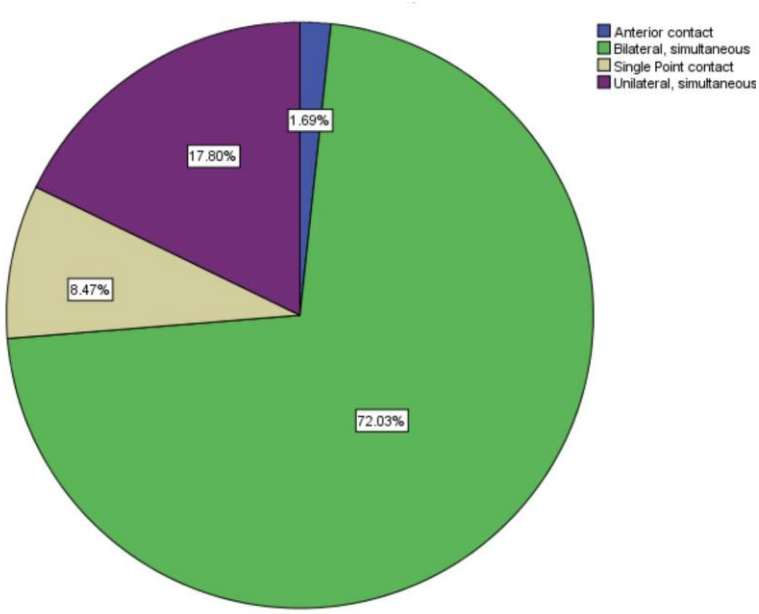

Figure 7. Pie chart showing the percentage of distribution of responses for the question, **"**What kind of contacts are present in Balanced occlusion?" where the majority of the respondents (72.03,%, green) responded to bilateral, simultaneous. (17.80%, purple) responded unilateral, simultaneous. (8.47%, yellow) responded single point contact and (1.69%, blue) responded anterior contact.

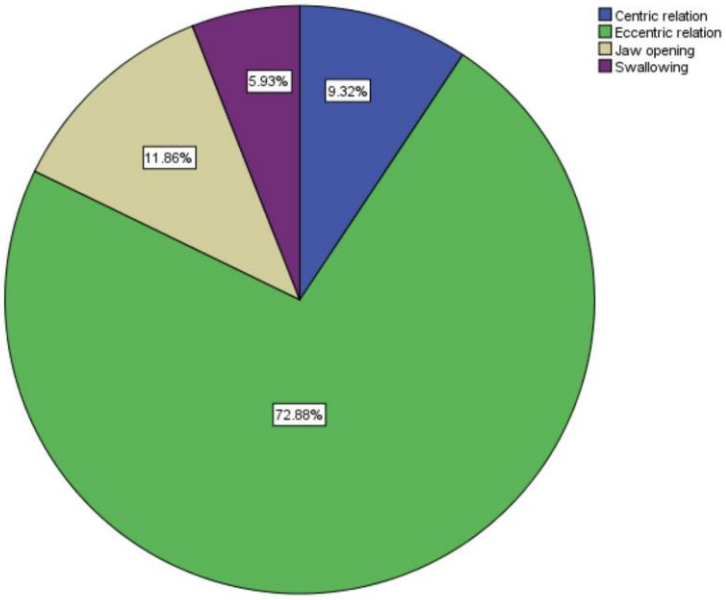

Figure 8. Pie chart showing the percentage of distribution of responses for the question, **"**During which movement would balancing contacts prevent tipping?" where the majority of the respondents (72.88%, green) responded eccentric relation, (11.86%, yellow) responded jaw opening. (9.32%, blue) responded centric relation and (5.93%, purple) responded swallowing.

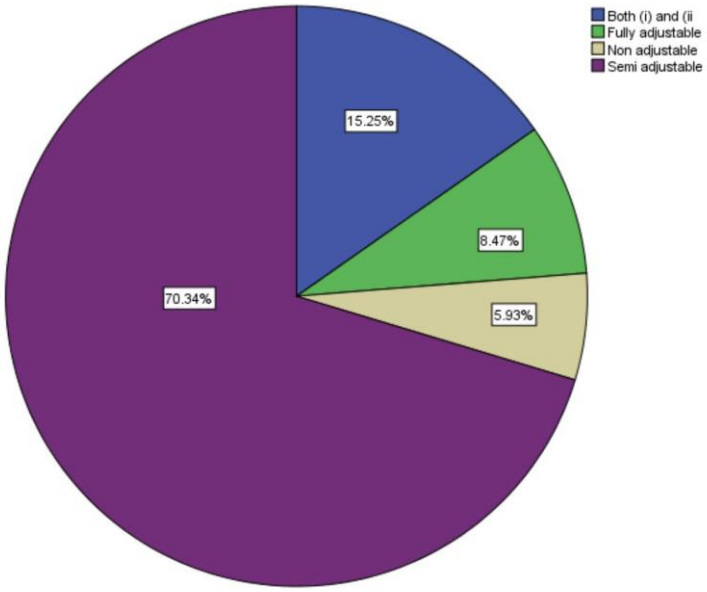

Figure 9. Pie chart showing the percentage of distribution of responses for the question, **"**What kind of articulators are required for establishing balanced occlusion?" where the majority of the respondents (70.34%, purple) responded semi adjustable, (15.25%, blue) responded both (i) and (ii), (8.47%, green) responded fully adjustable and (5.93%, yellow) responded non adjustable.

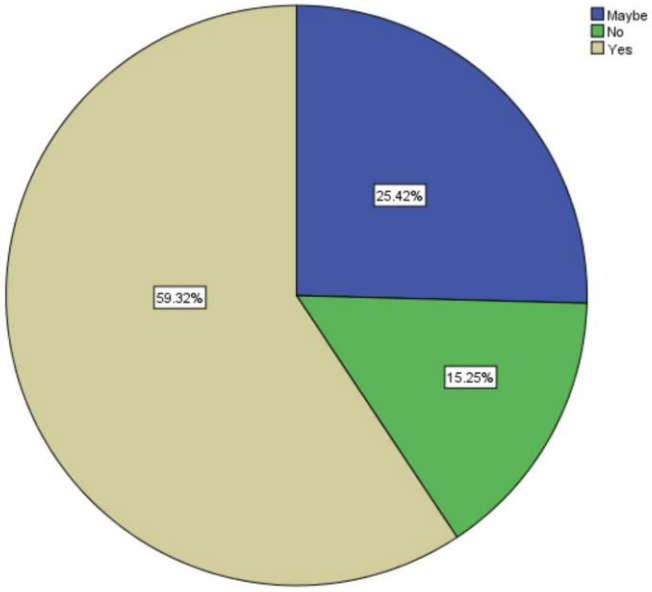

Figure 10. Pie chart showing the percentage of distribution of responses for the question, **"**Can balanced occlusion be established using lingualized teeth?" where the majority of the respondents (59.32%, yellow) responded yes, (25.42%, blue) responded maybe, (15.25%, green) responded no.

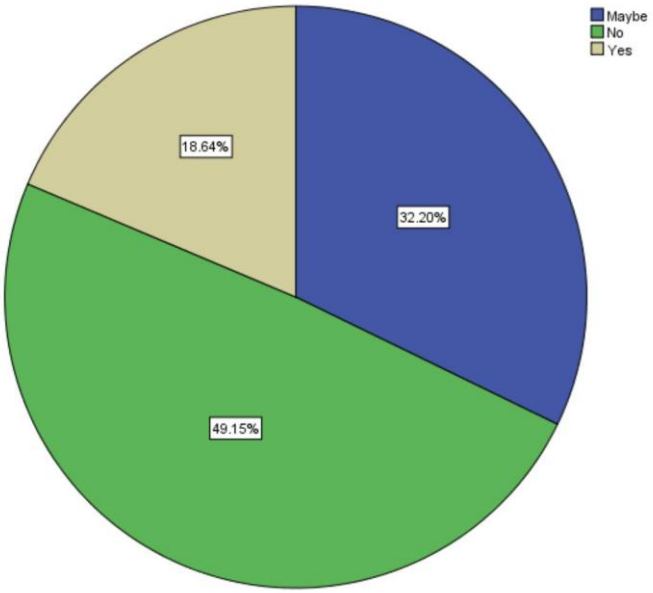

Figure 11. Pie chart showing the percentage of distribution of responses for the question, **"**Can balanced occlusion be established using monoplane teeth?" where the majority of the respondents (49.15%, green) responded no, (32.20%, blue) responded maybe, (18.64%, yellow) responded yes.

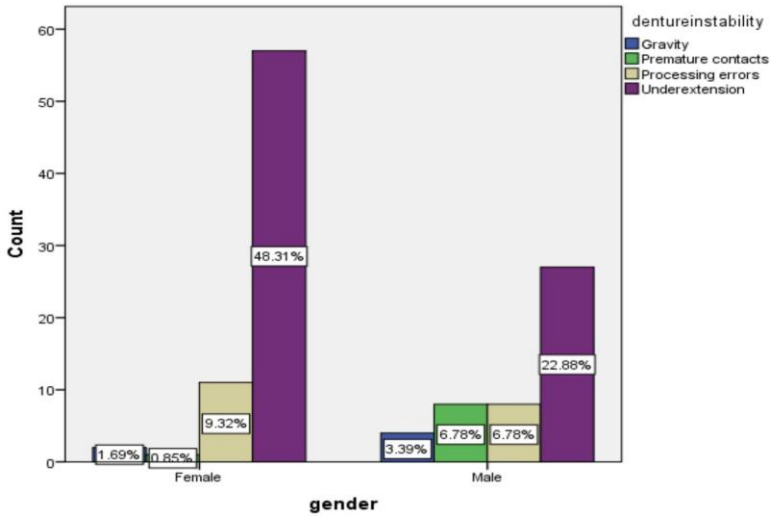

Figure 12. Bar graph depicting the association between gender and the awareness of primary cause of denture instability where blue denotes gravity, green denotes premature contacts, yellow denotes processing errors and purple denotes underextension. X axis represents the gender and Y axis represents the number of respondents. Chi square test shows p = 0.005, so ($p<0.05$ indicates statistically significant). So there is a significant association between gender and the awareness of primary cause of denture instability, proving females have better awareness than males.

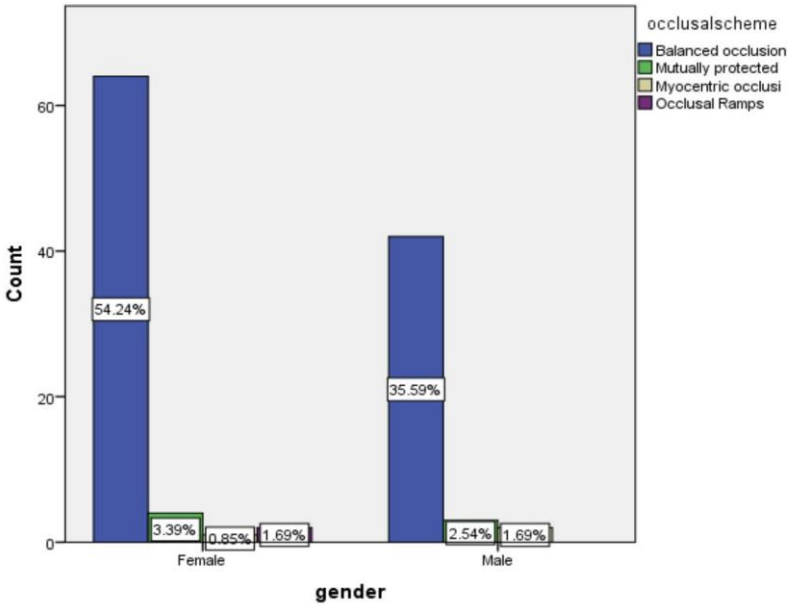

Figure 13. Bar graph depicting the association between gender and the awareness of the occlusal scheme to be provided in a complete denture where blue denotes balanced occlusion, green denotes mutually protected occlusion, yellow denotes myocentric occlusion and purple denotes occlusal ramps. X axis represents the gender and Y axis represents the number of respondents. Chi square test shows p=0.521, so (p>0.05 indicates statistically not significant). So there is no significant association between gender and the awareness of the occlusal scheme to be provided in a complete denture, proving females have better awareness than males.

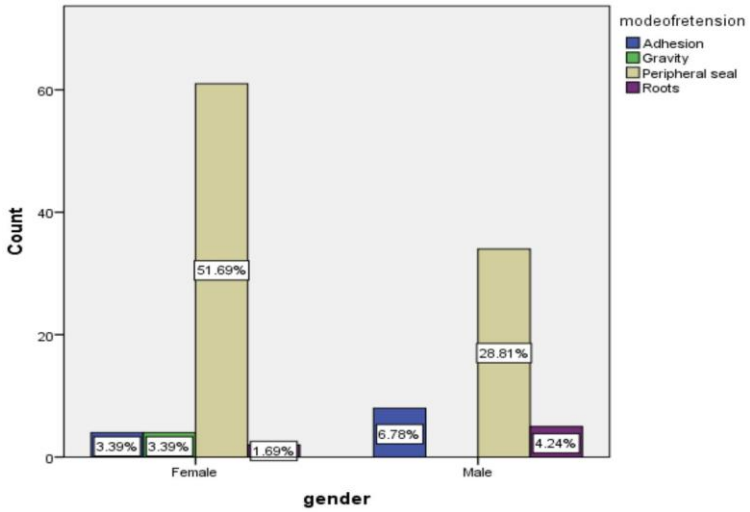

Figure 14. Bar graph depicting the association between gender and the awareness of the mode of retention in a denture where blue denotes adhesion, green denotes gravity, yellow denotes peripheral seal and purple denotes roots. X axis represents the gender and Y axis represents the number of respondents. Call hi square test shows p = 0.020, so (p<0.05 indicates statistically significant). So there is a significant association between gender and the

awareness of the mode of retention in a denture, proving females have better awareness than males.

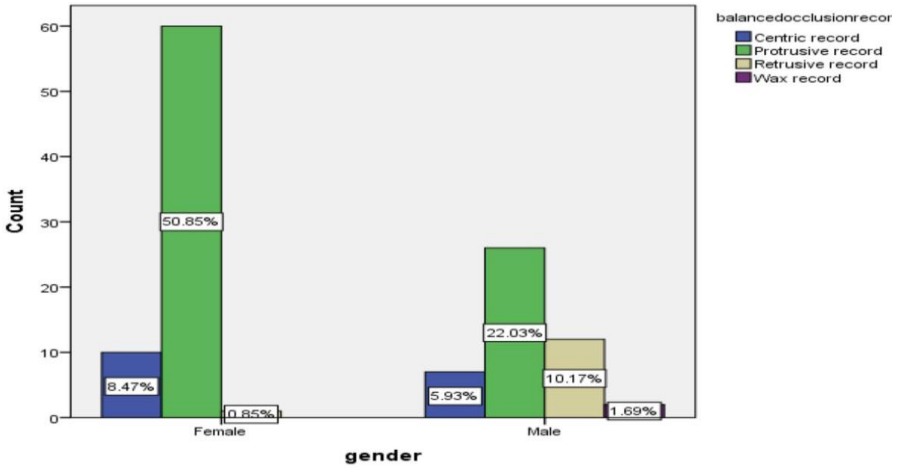

Figure 15. Bar graph depicting the association between gender and the awareness of record needed to provide balanced occlusion where blue denotes centric record, green denotes protrusive record, yellow denotes retrusive record and purple denotes wax record. X axis represents the gender and Y axis represents the number of respondents. Chi square test shows p=0.000, so (p<0.05 indicates statistically significant). So there is a significant association between gender and the awareness of record needed to provide balanced occlusion, proving females have better awareness than males.

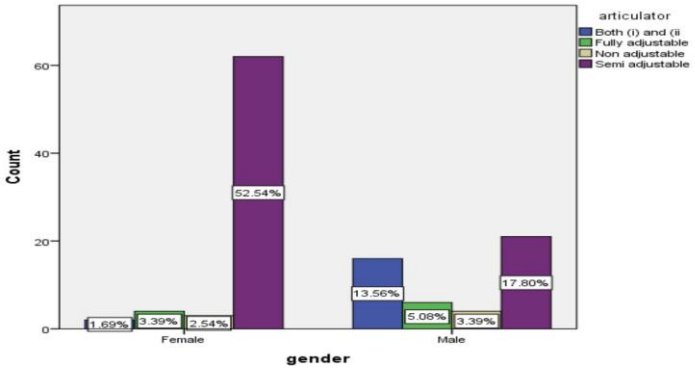

Figure 16. Bar graph depicting the association between gender and the awareness of the kind of articulator required to establish balanced occlusion where blue denotes both (i) and (ii), green denotes fully adjustable, yellow denotes non adjustable and purple denotes semi adjustable. X axis represents the gender and Y axis represents the number of respondents. Chi square test shows p=0.000, so (p<0.05 indicates statistically significant). So there is a significant association between gender and the awareness of the kind of articulator required to establish balanced occlusion, proving females have better awareness than males.

CONCLUSION

This survey shows that the awareness of occlusal schemes among second year students should improve before they step into the clinical field of practise and

occlusal schemes must be selected depending upon the situation of the patient.

ACKNOWLEDGEMENT
The authors acknowledge the participants who took part in the survey.

AUTHOR CONTRIBUTION
Twinkle Francis has contributed for the execution of the work, data collection and drafting of manuscript. Dr. Venkatesh Kommi has contributed for concept and design of the study, validation of the data collection. Dr. Keerthi Sasank has contributed for the revision and proof-reading of the review. Anjali.A.K has contributed for, validation of the data collection, revision and proof-reading of the review.

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

REFERENCES
Abduo, J. (2013) 'Occlusal Schemes for Complete Dentures: A Systematic Review', The International Journal of Prosthodontics, pp. 26–33. doi: 10.11607/ijp.3168.

Ajay, R. et al. (2017) 'Effect of surface modifications on the retention of cement-retained implant crowns under fatigue loads: An In vitro study', Journal of Pharmacy And Bioallied Sciences, p. 154. doi: 10.4103/jpbs.jpbs_146_17.

Ariga, P. et al. (2018) 'Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review', World Journal of Dentistry, pp. 68–75. doi: 10.5005/jp-journals-10015-1509.

Ashok, V. et al. (2014) 'Lip Bumper Prosthesis for an Acromegaly Patient: A Clinical Report', The Journal of Indian Prosthodontic Society, pp. 279–282. doi: 10.1007/s13191-013-0339-6.

Ashok, V. and Suvitha, S. (2016) 'Awareness of all ceramic restoration in rural population', Research Journal of Pharmacy and Technology, p. 1691. doi: 10.5958/0974-360x.2016.00340.1.

Basha, F. Y. S., Ganapathy, D. and Venugopalan, S. (2018) 'Oral Hygiene Status among Pregnant Women', Research Journal of Pharmacy and Technology, p. 3099. doi: 10.5958/0974-360x.2018.00569.3.

Cameron, S. M. (2004) 'The complete denture: A clinical pathway', Journal of Prosthodontics, pp. 65–66. doi: 10.1111/j.1532-849x.2003.63_3_3.x.

Collett, H. A. (1955) 'The movements of the temporomandibular joint and their relation to the problems of occlusion', The Journal of Prosthetic Dentistry, pp. 486–496. doi: 10.1016/0022-3913(55)90177-3.

Deniz, D. A. and Kulak Ozkan, Y. (2013) 'The influence of occlusion on masticatory performance and satisfaction in complete denture wearers', Journal of oral rehabilitation, 40(2), pp. 91–98. doi: 10.1111/joor.12015.

Dl, S. and Sarandha, D. L. (2007) 'Anatomical Landmarks of Significance in Complete Denture Treatment', Textbook of Complete Denture Prosthodontics, pp. 5–5. doi: 10.5005/jp/books/10902_2.

Duraisamy, R. et al. (2019) 'Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments', Implant dentistry, 28(3), pp. 289–295. doi: 10.1097/ID.0000000000000885.

Ganapathy, D. et al. (2016) 'Effect of Resin Bonded Luting Agents Influencing Marginal Discrepancy in All Ceramic Complete Veneer Crowns', Journal of clinical and diagnostic research: JCDR, 10(12), pp. ZC67–ZC70. doi: 10.7860/JCDR/2016/21447.9028.

Ganapathy, D. M., Kannan, A. and Venugopalan, S. (2017) 'Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis', World Journal of Dentistry, pp. 496–502. doi: 10.5005/jp-journals-10015-1493.

Hanau, R. L. (1926) 'Articulation Defined, Analyzed and Formulated**Read before the Section on Full Denture Prosthesis at the Sixty-Seventh Annual Session of the American Dental Association, Louisville, Ky., Sept. 24, 1925', The Journal of the American Dental Association (1922), pp. 1694–1709. doi: 10.14219/jada.archive.1926.0289.

Hanau, R. L. (1929) 'Occlusal Changes in Centric Relation**Read before the Section on Full Dentures at the Midwinter Clinic of the Chicago Dental Society, Jan. 15, 1929', The Journal of the American Dental Association (1922), pp. 1903–1915. doi: 10.14219/jada.archive.1929.0275.

Howell, P. (2004) 'Complete Dentures. A Clinical Manual for the General Dental Practitioner', Oral Diseases, pp. 246–246. doi: 10.1111/j.1601-0825.2004.01016.x.

Jacobson, T. E. and Krol, A. J. (1983) 'A contemporary review of the factors involved in complete denture retention, stability, and support. Part I: retention', The Journal of prosthetic dentistry, 49(1), pp. 5–15. doi: 10.1016/0022-3913(83)90228-7.

Jain, A., Ranganathan, H. and Ganapathy, D. (2017) 'Cervical and incisal marginal discrepancy in ceramic laminate veneering materials: A SEM analysis', Contemporary Clinical Dentistry, p. 272. doi: 10.4103/ccd.ccd_156_17.

Jyothi, S. et al. (2017) 'Periodontal Health Status of Three Different Groups Wearing Temporary Partial Denture', Research Journal of Pharmacy and Technology, p. 4339. doi: 10.5958/0974-360x.2017.00795.8.

Kannan, A. and Venugopalan, S. (2018) 'A systematic review on the effect of use of impregnated retraction cords on gingiva', Research Journal of Pharmacy and Technology, p. 2121. doi: 10.5958/0974-360x.2018.00393.1.

Kawano, F. et al. (1996) 'Influence of the buccolingual position of artificial posterior teeth on the pressure distribution on the supporting tissue under a complete denture', Journal of Oral Rehabilitation, pp. 456–463. doi: 10.1111/j.1365-2842.1996.tb00879.x.

Lang, B. R. (2004) 'Complete denture occlusion', Dental clinics of North America, 48(3), pp. 641–65, vi. doi: 10.1016/j.cden.2004.03.006.

Loh, P. J. and Levey, C. (2018) 'Occlusal schemes for complete dentures', Evidence-based dentistry, pp. 116–117. doi: 10.1038/sj.ebd.6401346.

Neto, A. F., Junior, W. M. and da Fonte Porto Carreiro, A. (2010) 'Masticatory afficiency in denture wearers with bilateral balanced

occlusion and canine guidance', Brazilian Dental Journal, pp. 165–169. doi: 10.1590/s0103-64402010000200013.

Sears, V. H. (1937) 'Factors in the Design of Special Occlusal Forms for Artificial Posterior Teeth**Read at a joint session of the National Society of Denture Prosthetists and the American Full Denture Society, New Orleans, La., Nov. 2, 1935.Received for publication Feb. 1, 1937', The Journal of the American Dental Association and The Dental Cosmos, pp. 626–631. doi: 10.14219/jada.archive.1937.0082.

Sears, V. H. (1938) 'An Analysis of Art Factors in Full Denture Construction', The Journal of the American Dental Association and The Dental Cosmos, pp. 3–12. doi: 10.14219/jada.archive.1938.0028.

Selvan, S. R. and Ganapathy, D. (2016) 'Efficacy of fifth generation cephalosporins against methicillin-resistant Staphylococcus aureus-A review', Research Journal of Pharmacy and Technology, p. 1815. doi: 10.5958/0974-360x.2016.00369.3.

Subasree, S., Murthykumar, K. and Dhanraj (2016) 'Effect of Aloe Vera in Oral Health-A Review', Research Journal of Pharmacy and Technology, p. 609. doi: 10.5958/0974-360x.2016.00116.5.

Venugopalan, S. et al. (2014) 'Magnetically retained silicone facial prosthesis', Nigerian journal of clinical practice, 17(2), pp. 260–264. doi: 10.4103/1119-3077.127575.

Vijayalakshmi, B. and Ganapathy, D. (2016) 'Medical management of cellulitis', Research Journal of Pharmacy and Technology, p. 2067. doi: 10.5958/0974-360x.2016.00422.4.