Awareness about Face Bow and its Types among Dental Professionals- A Questionnaire Based Survey

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Abstract

A face bow is a caliper like instrument used to record spatial relation from maxillary arch to the anatomical points and transfer the jaw relation to an articulator. It orients the dental cast in the same relationship to the opening axis of the articulator. There are mainly two types of face bows - Kinematic and Arbitrary face bows. Arbitrary face bows inturn have many subtypes based on anterior and posterior reference point indicators and the mechanism of inter condylar distance equilibrium.The questionnaire containing questions about face bows and its types was circulated to about 100 participants through google docs - online survey. The study was approved ethically by IERB.The responses generated from the survey were converted into pie charts and recorded. The answers obtained are discussed by comparing with the previous articles.The survey study shows how much Dental professionals know about face bows and its types and implementing them in their practice.

Keywords: *Dentists, Hinge axis, Face Bows, Kinematics and Arbitrary Face bows.*

Introduction

A face bow is a caliper like instrument used to record spatial relation from maxillary arch to the anatomical points and transfer the jaw relation to an articulator. It orients the dental cast in the same relationship to the opening axis of the articulator. There are mainly two types of Face bows - Kinematic and Arbitrary face bows.[1] Kinematic face bows contain adjustable caliper ends and locates the exact axis of rotation and hinge axis. Arbitrary Face bows relates maxilla to the exact position of condylar axis and transfer relation. Arbitrary face bows are classified based on posterior, anterior reference point indicators and mechanisms of inter - condylar distance equilibrium.[2] Based on posterior reference indicators, they are infra orbital and nasion pointers. Based on the mechanism of inter condylar distance equilibrium arbitrary face bows are classified to spring bows, calibrated condylar rods and slidematic face bows. Face bow follows oriental jaw relations.[3] Face bows are most widely used in prosthodontic rehabilitations. They are used in the complete denture fabrication. Face bow records are transferred to articulators to prevent any occlusal errors since the distance from condyle to teeth is crucial. In the prosthodontic procedures, failure to use the face bow often leads to error in occlusal records.[4] Hinge axis is a major component in the masticatory movement of the mandible and hence it cannot be disregarded. Hinge axis accurately captured and transferred to the articulator represents the occlusal aspect of a patient. Hinge axis is determined by the type of face bow used.[5]

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Previous studies that are based on the effects of direct and indirect face bow transfer on the horizontal condylar guidance values in a semi adjustable articulator. The results from the study shows a statistically significant difference in the HCG values in direct and indirect face bow transfer.[6]

Dental professionals need to be aware of the types of Face bows as they help to find accurate Hinge axis of patient and ensure proper occlusion and good treatment. Face bows are widely used for good complete denture fabrication and reduce error in occlusion.[7] The main aim of the study is to create awareness among dental professionals about the use of Face bows and its types through a survey.

Materials and Methods

The Study setting is an online survey conducted using a self prepared questionnaire to 100 participants in the south indian population. The previous studies done based on Face bows had a population of 30 participants and 10 participants.[8,9] The internal validity in the study is the pre-tested questionnaire and the external validity is the homogenisation and replication of experiment and cross verification with the existing studies.

The questionnaire is circulated online among dental professionals and the data collection software used is Google Forms. The responses obtained are converted to pie charts for representation

The statistical test used here is the chi-square test and the statistical software is SPSS software. The independent variable here is age,gender and qualifications and the dependent variables are the facebow usage,applications and any complications of facebow if any. The statistical analysis here is done by chi-square test and correlation analysis test. In this, the type of analysis used for correction and association is the chi-square test.

RESULTS AND DISCUSSION

In this survey study,we have discussed about the awareness of facebow usage among dental professionals from the responses gathered from the online survey.This survey contains questions based on their knowledge about the types of facebow,the individual uses of each facebow,correct handling of facebow and the reference points of facebow.The results are converted to pie charts for easy handling.

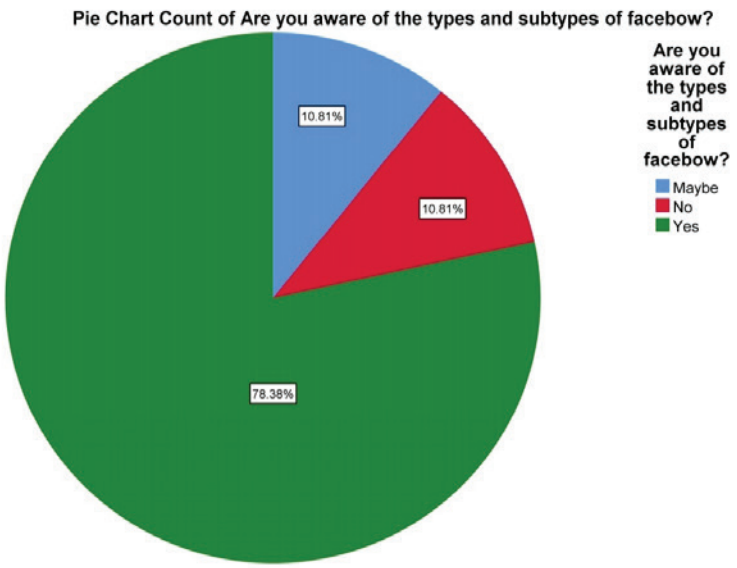

Figure 1: Pie chart representing frequency distribution of the response showing the awareness on the types of face bow. 78.38% answered yes(green), 10.81% answered no(red) and 10.81% answered maybe(blue)

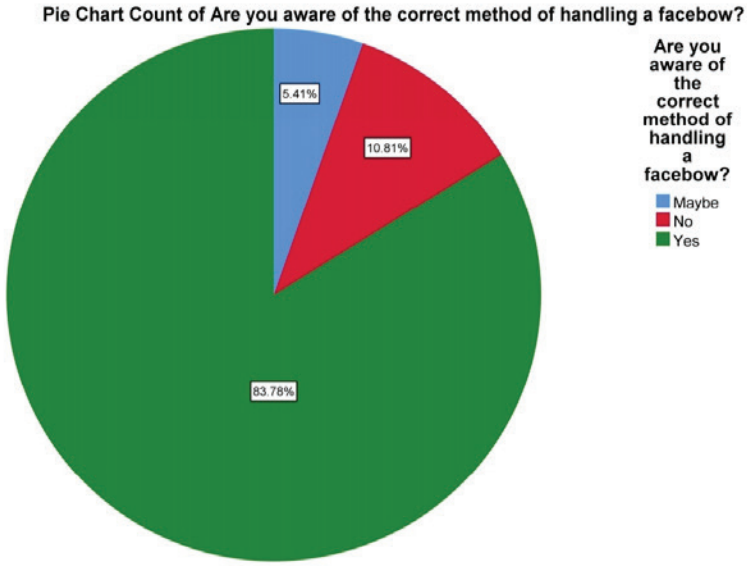

Figure 2:Pie chart representing percentage response on knowledge about the method of handling a facebow. 83.78% answered yes(green), 10.81% answered no(red) and 5.41% answered maybe(blue).

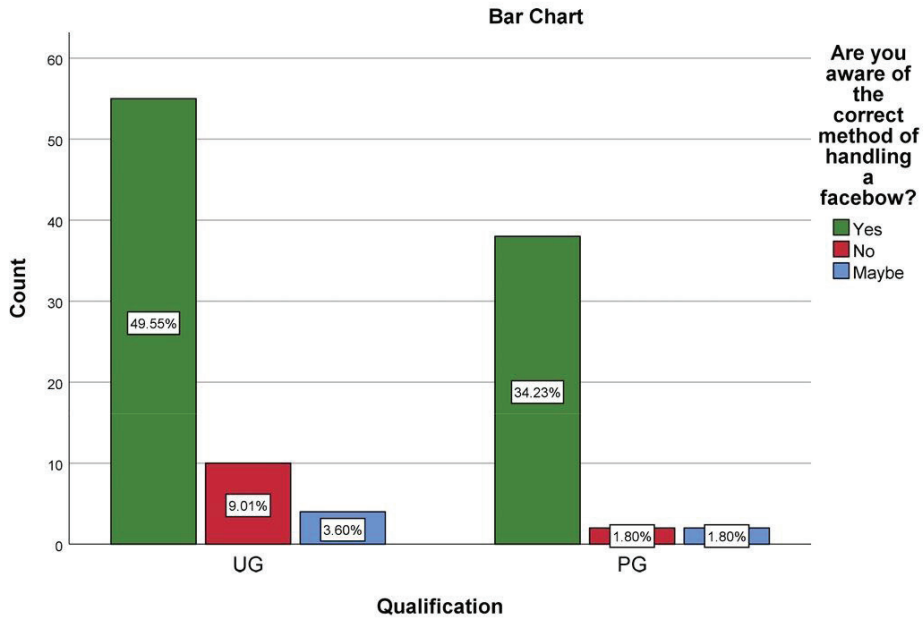

Figure 2.1: Bar graph representing the percentage response on knowledge about the method of handling a face bow. X-axis represents the qualification whether the professional is an undergraduate or postgraduate.Y-axis represents the percentage of awareness of handling of face bows. Green colour represents yes, red colour represents no and blue colour represents may be.Higher number of undergraduate professionals answered yes and there is a difference in responses between undergraduate and postgraduate professionals. Pearson Chi square test: 2.700a ; df: 2; p value: 0.259(>0.05), hence it is statistically not significant. This proves there is a similar percentage of awareness about the method of handling face bows among both UG and PG professionals.

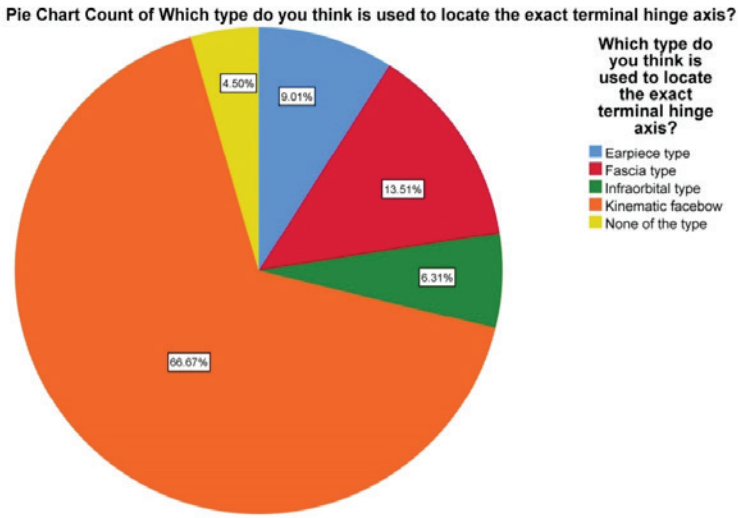

Figure 3: Pie chart representing frequency distribution of percentage response for the type of facebow used in locating the exact terminal hinge axis.9.01% answered earpiece type(blue), 13.51% answered fascia type(red), 6.31% answered infraorbital type(green), 66.67% answered kinematic face bow(orange) and 4.5% answered none of the above(yellow).

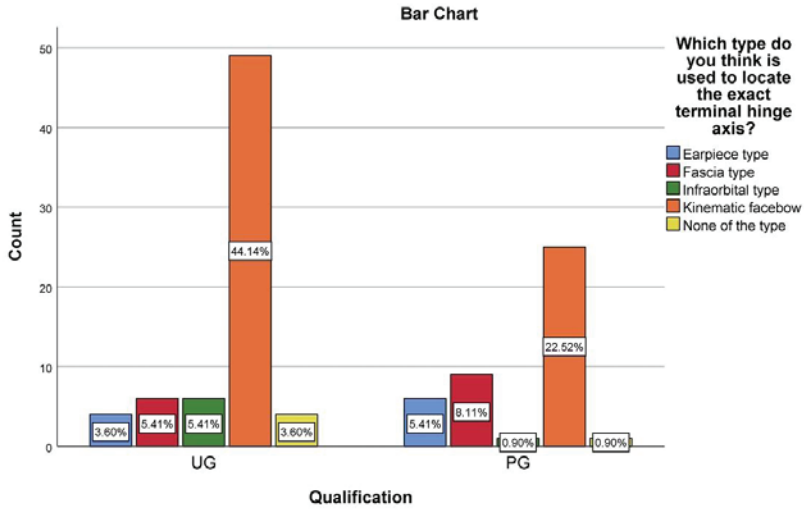

Figure 3.1: Bar graph representing the percentage response on the type of face bow used in locating the exact terminal hinge axis.X-axis represents the qualification whether the professional is an undergraduate or postgraduate.Y-axis represents the percentage of knowledge on the type of facebow used to locate hinge axis. Blue colour represents earpiece type, red colour represents fascia type, green colour represents infraorbital type, orange colour represents kinematic face bow and yellow colour represents none of the above. Higher number of undergraduate professionals answered kinematic face bow and there is a difference in responses between undergraduate and postgraduate professionals. Pearson Chi square test: 8.065a ; df- 4; p value: 0.089(>0.05), hence it is statistically not significant. This shows that there is a similar level of awareness about the type of face bow used in locating the exact hinge axis among both UG and PG professionals.

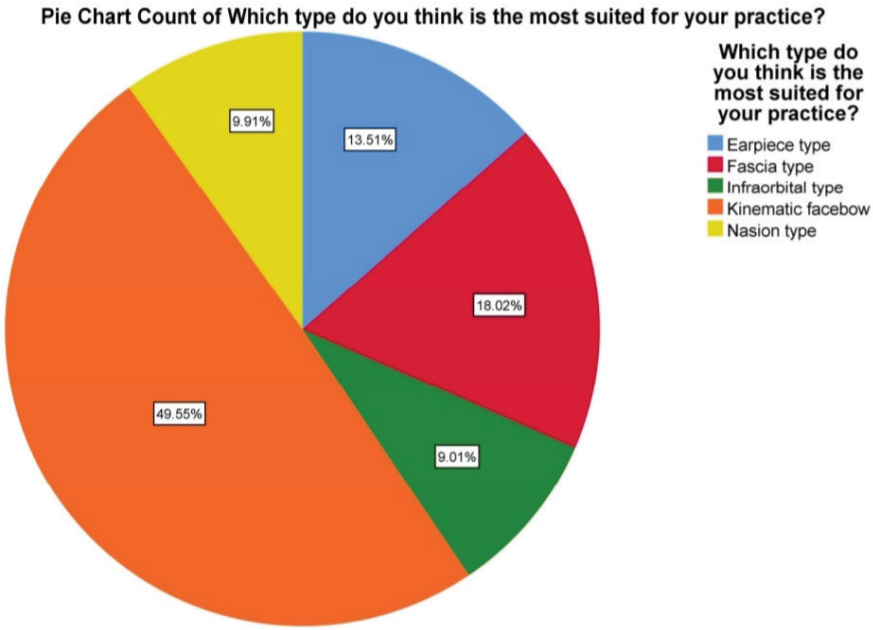

Figure 4:Pie chart representing the frequency distribution of the percentage response for the type of face bow used in dental practice.13.51% answered earpiece type(blue), 18.02% answered Fascia Type (Red), 49.55% Kinematic Face Bow (Orange), 9.01% Infra Orbital type (green), 9.91% (Yellow)

The figure 1 is about the participant's awareness of types of facebow. 78.38% responded positively, 10.31% responded negatively and 10.31% responded probably. Facebow usage is mandatory for remounting of maxillary cast in articulator having a fixed axis of opening.Failure in usage of a facebow leads to an error in occlusion.[10]

The figure 2 is about the method of handling facebows by the participants. 83.78% answered positively, 10.81% responded negatively and 5.41% answered probably. Facebow handling should be done properly to prevent errors in occlusion.[11] Figure 2.1 shows the percentage response on knowledge about the method of handling a face bow. X-axis represents the qualification whether the professional is an undergraduate or postgraduate.Y-axis represents the percentage of awareness of handling of face bows. Green colour represents yes, red colour represents no and blue colour represents may be.Higher number of undergraduate professionals answered yes and there is a difference in responses between undergraduate and postgraduate professionals. Pearson Chi square test: 2.700a ; df: 2; p value: 0.259(>0.05), hence it is statistically not significant. This proves there is a similar percentage of awareness about the method of handling face bows among both UG and PG professionals.

The figure 3 is about the knowledge on facebow used in finding the exact terminal hinge axis. The answers are 9% answered earpiece types, 13.5% answered fascia type , 6.3% from infraorbital type,66.6% answered kinematic face bow and 4.5% none of the above. Usually, Oriental Jaw relations are used in facebow to record occlusion. The position of the facebow and its relation to the articulator is important.[12–18], The kinematic Face bow connects the caliper ends to the exact hinge axis location.[19] Figure 3.1, Bar graph representing the percentage response on the type of face bow used in locating the exact terminal hinge axis.X-axis represents the qualification whether the professional is an undergraduate or postgraduate.Y-axis represents the percentage of knowledge on the type of facebow used to locate hinge axis.Blue colour represents earpiece type, red colour represents fascia type, green colour represents infraorbital type, orange colour represents kinematic face bow and yellow colour represents none of the above. Higher number of undergraduate professionals answered kinematic face

bow and there is a difference in responses between undergraduate and postgraduate professionals. Pearson Chi square test: 8.065a ; df- 4; p value: 0.089(>0.05), hence it is statistically not significant. This shows that there is a similar level of awareness about the type of face bow used in locating the exact hinge axis among both UG and PG professionals. professionals should know the reference points both anterior and posterior reference points. The posterior reference points are Baron point, Gysi, Snow and Denar point. The pointers used for finding anterior reference points are infraorbital and Nasion type facebows.[20] The pointers used for posterior reference points are Facia and earpiece type facebow.[21] The Face bow that uses external auditory meatus as a reference point is a kinematic face bow.[22] The figure 4 is about the participants choice about the type of Face bow used in Dental practice. The options are earpiece type, fascia type , infra orbital type , Kinematic Face bows and Nasion type. The responses are 13.5%, 18%, 9%, 49.5% and 9.9%. The figure 12 is about the awareness about the complications of Face bow usage. 68.5% responded positively, 15.3% responded negatively and 16.2% responded probably. The common complication that arises during Face bow usage are restriction of movement, different ear types in different individuals and alter arch for each individual.

The limitations of the study is that there are a minimum number of articles included. The other complications are the limited study population where the possible outcomes may vary. The results may vary with a bigger population.[23]

In the future awareness of Face bow types reduces errors in occlusion and proper usage ensures better treatment.[24–27]Virtual face bow transfer is a virtual procedure in which a digital maxillary cast is transferred to a virtual articulator using reverse engineering devices which is a futuristic approach.[28] Facebow transfers are used in prosthetic dentistry to record the anteroposterior and mediolateral spatial positions of maxillary cusps in relation to transverse opening and closing of mandible of the patient.[29–31]

Conclusion

Dental professionals must be aware of the types of Face bows as it helps in accurate detection of Hinge axis and proper occlusion. Incorrect records cause discomfort to patients during complete denture treatment. The above results conclude that the dental professionals require more information on types of Face bows to reduce errors in the future.

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