ORIGINAL ARTICLE

Utilization of Cone Beam Computed Tomography in Postgraduate Orthodontic Institutes

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ABSTRACT

Cone beam computed tomography is very important nowadays for diagnosis of various orthodontic conditions. The aim of present study was to find out the utilization and applicability of cone beam computed tomography at postgraduate orthodontic institutes. Current study was conducted at 4 public sector postgraduate orthodontic institutes of Punjab, Pakistan. A Cross-sectional survey was conducted consisting of MCQs that evaluated the utilization and applicability of cone beam computed tomography. Results showed that none of the 4 public sector postgraduate orthodontic institutes of Punjab, Pakistan, were having availability of cone beam computed tomography machines at the institute level. Cone beam computed tomography was highly used for impacted cuspid teeth. Cone beam computed tomography training was of traditional didactic nature and interpretation of cone beam computed tomography reports was the direct responsibility of specialists.

Keywords: Cone beam computed tomography; CBCT; Orthodontic.

INTRODUCTION

Cone beam computed tomography is very important nowadays for diagnosis of various orthodontic conditions. The study showed that after interpretation of cone beam computed tomography, subjects were surer about their diagnosis.[1] The study also showed that after interpretation of cone beam computed tomography, subjects made changes in their treatment planning on 27% of cases that was initially planned on 2-D diagnostic methods[1].

There are several indications of cone beam computed tomography in orthodontics, including, impaction of cuspids, odontomas, extra-teeth, impaction of cuspids with on-going root resorption, syndromes of orofacial region, temporo-mandibular joint disorders, breathing issues, placement of skeletal anchorage mini-screws/mini-plates, growth and surgical prediction, and for designing of three dimensional digital casts[2-5].

The main advantage of cone beam computed tomography is that its radiation dosages are just three to seven times more than that of 2-D radiography and several times less than other 3-D radiography techniques such as CT-scan.[6] The safest method of prescribing cone beam computed tomography for diagnosis of various orthodontic conditions is to use the ALARA principle. ALARA principle means: As Low As Reasonably Achievable[7]. Various guidelines are available regarding daily use of cone-beam computed tomography in orthodontics[8-10].

Several researches are available regarding precision, indications, and various other aspects of cone-beam computed tomography in orthodontics[11,12] but orthodontic literature is lacking regarding routine utilization and applicability of cone-beam computed tomography at postgraduate orthodontic institutes. International data is publishing in this regard[13] but local data is unknown regarding utilization and applicability of cone beam computed tomography at postgraduate orthodontic institutes of Pakistan.

The aim of present study was to find out the utilization and applicability of cone beam computed tomography at postgraduate orthodontic institutes i.e., de'Mont Dental College/Punjab Dental Hospital, Children's Hospital & Institute of Child Health-Lahore, Nishter Institute of Dentistry-Multan and Dental Section- FMU/PMC, Faisalabad.

MATERIAL AND METHODS

Present survey was conducted at the four public sector orthodontic centers i.e., de'Montmorency College of Dentistry-Lahore, Children's Hospital-Lahore, Nishter Institute of Dentistry-Multan and Dental Section-Faisalabad Medical University / Punjab Medical College. A Cross-sectional survey was conducted consisting of MCQs that evaluated the availability of cone beam computed tomography at the institution level. The questionnaire consisted of MCQs that evaluated the applicability of cone beam computed tomography i.e. prescription of cone beam computed tomography for various orthodontic conditions.

The questionnaire consisted of MCQs that evaluated the postgraduate training/knowledge of residents regarding cone beam computed tomography. The questionnaire also consisted of MCQs that asked about the cone beam computed tomography interpretation responsibility. Answers to different questions were gathered. The data analysis was done using Excel program (Microsoft).

RESULTS

Results showed that none of the 4 public sector postgraduate orthodontic institutes of Punjab, Pakistan, were having availability of cone beam computed tomography machines at the institute level. Cone beam computed tomography was highly used for impacted cuspid teeth (Fig.1). Cone beam computed tomography training was of traditional didactic nature and interpretation of cone beam computed tomography reports was the direct responsibility of specialists.

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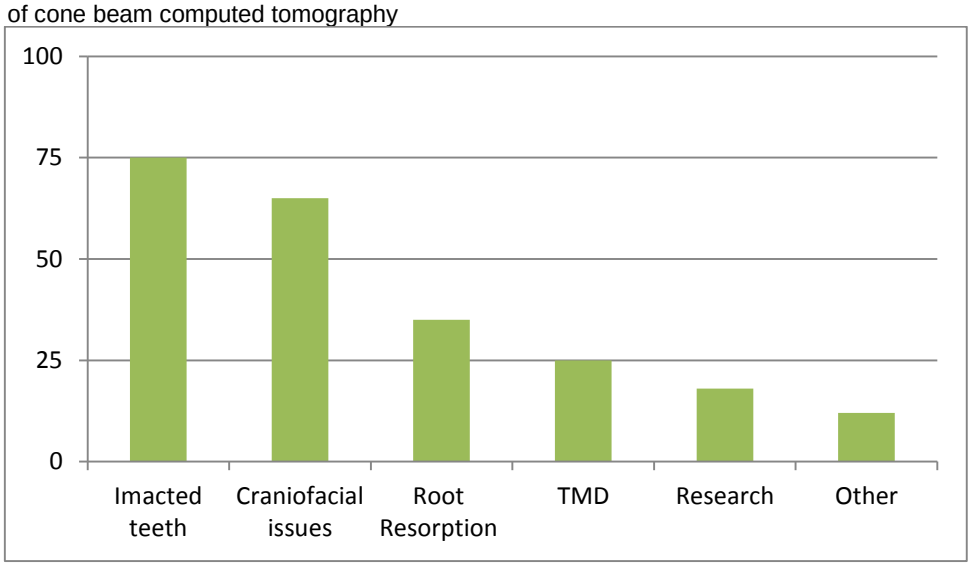
Fig. 1: Utilization of cone beam computed tomography



DISCUSSION

2-D radiography versus 3-D radiography is topic of research nowadays in orthodontics especially for diagnosis of various orthodontic conditions[14,15]. The objective of present study was to find out the utilization and applicability of cone beam computed tomography at postgraduate orthodontic institutes.

Cone beam computed tomography is very important nowadays for diagnosis of various orthodontic conditions. This Cross-sectional survey was conducted consisting of MCQs that evaluated the availability of cone beam computed tomography at the institution level. Results showed that none of the 4 public sector postgraduate orthodontic institutes of Punjab, Pakistan, were having availability of cone beam computed tomography machines at the institute level. This is not in accordance with the Smith et al., who reported that >83% orthodontic centers of USA and Canada are equipped with cone beam computed tomography machines at the institute level[16].

The questionnaire also consisted of MCQs that evaluated the applicability of cone beam computed tomography i.e., prescription of cone beam computed tomography for various orthodontic conditions. Results showed that cone beam computed tomography was highly used for impacted cuspid teeth which were followed by syndromes. This is in agreement with findings of studies by Liu et al[17] and Rajadhyksha et al[18] who also reported that cone beam computed tomography was highly used for impacted cuspid teeth. But our findings are in contrast with Rajadhyksha et al[18] who reported that cone beam computed tomography was 2nd highly used for TMJ disorders (56.25%) and adult orthodontics cases versus findings of our study where 2nd highest use of cone beam computed tomography was for craniofacial anomalies.

Furthermore the questionnaire consisted of MCQs that evaluated the postgraduate training/knowledge of residents regarding cone beam computed tomography. The questionnaire also consisted of MCQs that asked about the cone beam computed tomography interpretation responsibility. Results showed that cone beam computed tomography training was of traditional didactic nature and interpretation of cone beam computed tomography reports was the direct responsibility of specialists. This is not in accordance with the Smith et al., who reported that cone beam computed tomography training was both didactic and practical (hands-on) at majority of orthodontic centers of USA and Canada[16]. Results are also not in accordance with the Smith et al., who reported that interpretation of cone beam computed tomography reports was the direct responsibility of expert radiologists at 59% orthodontic centers of USA and Canada[16].

Thus it was found that none of the 4 public sector postgraduate orthodontic institutes of Punjab, Pakistan, were having availability of cone beam computed tomography machines at the institute level. Cone beam computed tomography was highly used for impacted cuspid teeth. Cone beam computed tomography training was of traditional didactic nature and interpretation of cone beam computed tomography reports was the direct responsibility of specialists.

Our suggestions are: Public sector postgraduate orthodontic institutes of Punjab, Pakistan, should be well equipped of cone beam computed tomography machines at the institute level, proper cone beam computed tomography hands-on training should be provided and interpretation of cone beam computed tomography reports should be the direct responsibility of expert radiologists.

CONCLUSION

None of the public sector postgraduate orthodontic institutes of Punjab got the facility of cone beam computed tomography machines at the institute level.
It is highly used for impacted cuspid teeth and there is need of skilled training for its proper interpretation.

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