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Importance of pilot and co-pilots in diagnosis and treatment planning of young ortho patients

Dental Science

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ABSTRACT

Diagnosis in orthodontics is rather different from diagnosis in medicine since it involves not merely localization of the disease or an anomaly but also a plan to normalize the existing malocclusion in the context of age. Comprehensive orthodontic diagnosis is established by use of certain clinical implements called diagnostic aids, which are further classified into essential and non- essential. Radiology has long played a critical in orthodontic diagnosis and treatment planning. Radiology has both direct and indirect effects on living system. The aim of the present study was to further burrow the impact of panoramic radiograph, lateral cephalogram and additional hand wrist radiograph in orthodontic diagnosis and treatment planning.

KEYWORDS:

Lateral cephalogram, hand wrist radiograph, panoramic radiograph, essential and non- essential diagnostic aids

Introduction

Proper treatment plan depends upon prompt diagnosis. Orthodontics diagnosis should be based on sound scientific knowledge combined at times with clinical experience and systematic, tentative, accurate guessing. Comprehensive orthodontic diagnosis is established by use of certain clinical implements called diagnostic aids, which are further classified into essential and non- essential. In growing patients, supplemental diagnostic aids such as lateral cephalometric radiograph and hand wrist radiograph are required in addition to essential diagnostic aids to render a diagnosis.

Since the introduction of lateral cephalometric radiography (LCR) by Broadbent in 1931, it has been widely used in orthodontic assessment and treatment planning[1–3]. Despite of that, its adequacy in orthodontics remains questionable. Silling et al[4] stressed that LCR was only needed for Class II division 1 patients. Later, Han et al[5] stated that patient examination together with dental casts provided sufficient information with which to render a diagnosis.

According to them, only 55% of treatment plans were changed after LCR evaluation. In the same vein, Bruks et al.[6] suggested that in 93% of the cases treatment plans remained unchanged after LCR evaluation. Recently, in 2015 Anna et al[7] stated that treatment planning seemed to be changed, on average, in 36% of the cases by adding LCR.

Keeping in mind the debate in the literature, the aim of the present study was to further burrow the impact of lateral cephalogram and additional hand wrist radiograph in orthodontic diagnosis and treatment planning.

Aims and objective

Impact of lateral cephalometric radiograph and hand wrist radiograph on orthodontic diagnosis and treatment planning.

Materials and method

Thirty patients seeking orthodontic treatment in Kothiwal Dental College and Research Centre, Moradabad for whom pre-treatment diagnostic records were available in the department were randomly selected.

Ten qualified orthodontists were involved in this study and their clinical expertise and skillfull judgement towards orthodontic treatment were recorded by means of a questionnaire containing 11 question for each patient were set.

The following questions were mounted:-

1. Skeletal relationship:- (a) Neutro relation (b) Disto relation (c) Mesio relation

2. Molar relationship based on Angle's classification:-
(a) Class l (b) Class ll (c) Class lll

3. What is the growth pattern of the patient?
(a) Average growth pattern
(b) Horizontal growth pattern
(c) Vertical growth pattern

4. When do you want to treat the patients? (a) Now (b) Later

5. Do you want to treat the patient with myofunctional /orthopedic appliance?
(a) Yes (b) No

6. If, yes which one would you like to choose?
(a) Twin block (b) Activator (c) Combination with headgear

7. Would you like to expand the arches?
8. Would you like to treat the case with extraction? (a) Yes (b) No
9. Would you like to treat the patient with surgery (a) Yes (b) No
10. How long you will take to complete the treatment?
(a) 18- 22months (b) 23-26months © 27-30months
11. How long it has been since, you have qualified as an orthodontist?

(a) 3-5 Years (b) 6-10 Years (c) 11-15 Years

The patient's records comprised of (figure 1):
-Standard clinical photographs comprising intra-oral and extra-oral photographs
-The angle trimmed dental casts
-Panoramic radiographs
-Lateral cephalometric
-Hand wrist radiograph

Same patients were shown to empanelled orthodontists three times with different diagnostic record.

First set
This set shown to orthodontists contained all the records excluding LCR and HWR.

Second set
This set shown to orthodontists contained all the diagnostic record but including LCR and excluding HWR.

Third set
Whereas in this set all the records were shown along with the HWR.

Inclusion criteria:
Patient of age 11years - 14years were included.

Fig:1- Diagnostic records

Result
Result (Table:-1) showed that the high co- relation in agreement in all the three session with regard to the diagnosis and the treatment planning. The kappa value of observer 2, 3, 4, 6,7,9,and 10 ranged from .887- 1 whereas the kappa value for observer1 and 8 ranged from .529- .667

Table 1- Shows co-relations in all three sesssions

	SESSION	Percent agreement	Kappa	P
Observer1	SESSION 1 SESSION 2	78.6%	.843	0.001
	SESSION 1 SESSION 3	78.6%	.667	.009
	SESSION 2 SESSION 3	78.6%	.825	.002
Observer2	SESSION 1 SESSION 2	100.0%	.887	0.001
	SESSION 1 SESSION 3	100.0%	.887	0.001
	SESSION 2 SESSION 3	100.0%	1	0.001
Observer3	SESSION 1 SESSION 2	78.6%	1	0.001
	SESSION 1 SESSION 3	78.6%	1	0.001
	SESSION 2 SESSION 3	78.6%	1	0.001
Observer4	SESSION 1 SESSION 2	100.0%	1	0.001
	SESSION 1 SESSION 3	100.0%	.767	0.001
	SESSION 2 SESSION 3	100.0%	.767	0.001
Observer5	SESSION 1 SESSION 2	100.0%	.887	0.001
	SESSION 1 SESSION 3	100.0%	.887	0.001
	SESSION 2 SESSION 3	100.0%	1	0.001
Observer6	SESSION 1 SESSION 2	100.0%	.902	0.001
	SESSION 1 SESSION 3	100.0%	.902	0.001
	SESSION 2 SESSION 3	100.0%	1	0.001
Observer7	SESSION 1 SESSION 2	100.0%	1	0.001
	SESSION 1 SESSION 3	100.0%	.887	0.001
	SESSION 2 SESSION 3	100.0%	.887	0.001
Observer8	SESSION 1 SESSION 2	78.6%	.676	.006
	SESSION 1 SESSION 3	78.6%	.529	.029
	SESSION 2 SESSION 3	78.6%	.843	0.001
Observer9	SESSION 1 SESSION 2	100.0%	.875	0.001
	SESSION 1 SESSION 3	100.0%	.875	0.001
	SESSION 2 SESSION 3	100.0%	1	0.001
Observer10	SESSION 1 SESSION 2	100.0%	1	0.001
	SESSION 1 SESSION 3	78.6%	.885	0.001
	SESSION 2 SESSION 3	78.6%	.896	0.001

Interpretation of Kappa.
- Poor agreement = Less than 0.20
- Fair agreement = 0.20 to 0.40
- Moderate agreement = 0.40 to 0.60
- Good agreement = 0.60 to 0.80
- Very good agreement = 0.80 to 1.00

Discussion
LCR and HWR has been routinely used since its discovery, although major concerns arise when patients are exposed to radiation when it is not clearly justified. According to the ALARA principle, there is a need to reduce radiation exposure and eliminate unnecessary radiographs.

This study was conducted to highlight the impact of two-dimensional cephalometric imaging and hand wrist radiograph for orthodontic diagnosis treatment planning. Patients were selected randomly with specific age. A total of ten orthodontist participated in study. The most experienced observer had the experience of 10- 15 years and the least experienced observer had the experience of 3- 5 years.

It was noted that the observer 4, 6, 10 with maximum experience do not require LCR and HCR Whereas it was noted that observer 8 who has the minimum experience of about 3- 5 years required further additional radiographs. Observations made by observers 2, 4, 3, 6,9

and 10 had the kappa value of .80 to 1.00 signifying very good agreement. On the other hand the observer number 1, 5, 7 and 10 had good agreement .The observations made by observer number 8 who had the minimum experience the kappa value was .529 denoting moderate agreement. In general, the biggest complaint from orthodontists was the absence of clinical examination. According to them examining patient clinically would reveal the chief complain of the patient.

Another orthodontist ascertained that for all cases the natural head position, dental casts in centric relation, and LCR together with clinical examination of the patient would be important to render a diagnosis and develop a treatment plan.

Conclusion

- The results of my study suggest that the majority of orthodontists judge that LCR and HWR is important to producing a treatment plan.
- Despite that, it does not seem to have an influence on orthodontic treatment planning.

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