Incorrect Diagnosis by Positioning Errors in Panoramic Radiographs

Glauce Crivelaro Nascimento¹, Yamba Carla Lara Pereira¹, Rafael Rondon²

1 Department of Morphology, Physiology and Basic Pathology, School of Dentistry of Ribeirão Preto, University of São Paulo, Brazil.
2 Stomatology and Oral Diagnostic Program, School of Dentistry of São Paulo, University of São Paulo, Brazil.

1 Introduction

The “strange phenomenon”, discovered by Wilhelm Conrad Röntgen in the nineteenth century, that sensitized barium platinocyanide plates at the time of their studies on cathode rays in the gas tube, were called Ray X. The discovery of these new rays with singular characteristics gave greater clinical and practical insight into dentistry. This new form of energy gave rise to imaging obtained from the record of an image made by x-irradiation, which in passing through an object reaches a radiographic sensor producing a latent image that is capable of processing. The importance of this examination has been established since its discovery (Sewell et al., 2001). The risks of using ionizing radiation for diagnostic purposes emerged some time later. Therefore, measures such as the improvement of apparatuses, the use of faster image receptors, and the selection of the most appropriate technique are increasingly in evidence (Muhammed et al., 1982). The deleterious effects of X-radiation on living organisms emerged after its intensified use in the field of radiology, which resulted in chronic dermatitis and caused even lethal changes. Providing necessary information is essential to presenting an image of quality; otherwise, the diagnosis may be harmed. Furthermore, quality radiographic images are fundamental to a conservation file, being of great value in legal issues.
The two-dimensional image, obtained by a radiography of a three-dimensional structure, is one of the limitations to overcome. Aiming to overcome this difficulty, several researchers have over the years developed specific radiographic techniques to increase the security of diagnosis. A radiographic examination is an important resource for obtaining the diagnosis of lesions of the complex jaw. One of the complementary exams more often performed by the dentist is the radiographic examination, which is important for the auxiliary diagnostic in oral problems (Sewell et al., 2001).

Panoramic radiographs are a type of radiographs obtained from equipment and sensor located outside the patient’s mouth; they are therefore, extraoral. In this type of examination, the head and the doorframe rotate around the patient’s head, giving the professional a final exam that allows a broader view of the anatomical regions, although less rich in detail and accuracy of information compared with the intraoral technique. In contrast, the radiographic examination of the dentoalveolar region and its adjacent structures in a single image receptor has become a key point in clinical practicality, highlighting its role in the diagnosis. In this sense, quality control in dental radiology has been wrongly understood as only in how to control the equipment, such as X-ray apparatuses and processors (Zubeldia et al., 2003). However, another fundamental parameter that influences the quality service provided is the training of professionals who perform radiographs, the quality of which must kept control of in order to provide security for the exams.

Therefore, professionals who perform radiographs in dental clinics have a responsibility to perform them with a high diagnostic quality. They must be competent in the execution of techniques and in the management and processing of i, since unsatisfactory quality of radiographs may result in mistakes in diagnosis and, consequently, in treatment (Langland & Langlais, 2002; Freitas & Becker, 2000). Obtaining better image quality becomes an important factor to be considered. The image quality, without blur, is determined by the distance of the tube, the focal plane, film, and the rotation of the tube. It is known that the epicenter of rotation changes as the image receptor or sensor revolves in an elliptical way around the dental arches format.

Currently, the most commonly extraoral examination performed is panoramic radiography. Radiographs commonly used are the conventional Panoramic (Standard), the Panoramic for purposes of implant, the Panoramic for temporomandibular joint, including ascending branches of right and left sides, and the Panoramic for paranasal sinuses. The evolution of this test is related to the improvement in image quality obtained with a decreased radiation dose at the lowest cost to the patient; increasing the dose, thus, has indications. In this radiographic technique, the patient’s position is critical how in focus the teeth and bones are in the image (Dhilon et al., 2012).

So, in the execution of a panoramic radiograph, care with positioning of the patient and the following procedures is essential (Kaviani et al., 2008). Passler and Visser (2006) reported in their work that to obtain a panoramic radiograph with an appropriate standard, the technician must observe the following rules: positioning the patient upright with an elongated neck, shoulders down, back straight, and feet together; Frankfurt plane parallel to the ground and the median sagittal plane perpendicular to the ground; mental supported in the chin cup support of the frontal region and the tongue
Figure 1: Panoramic Radiograph with high standard, within the normal range.

against the palate (Figure 1).

Thus, properly positioning the patient in the machine is the most important factor in preventing a cascade of errors, since multiple mistakes may follow automatically from the first mistake. Given the importance of this type of error, the aim of this study discusses what the literature offers to evaluate common positioning errors associated with the panoramic radiographs. Whereas it is not always obvious to the operator that an error has been made, this work will approach errors based on problems seen in radiography that injure their diagnostic quality. This study emphasized the most important factor for obtaining panoramic radiographs with good quality is by properly positioning the patient in the machine. This issue has been continually of interest since panoramic radiography was first invented.

2 The Panoramic Radiograph

The first panoramic radiograph happened in 1934 (Ramesh et al., 2001). This radiograph is an imaging of the mouth, which allows better visualization of the maxillomandibular complex in just one radiograph (Alkurt et al., 2007). It consists of a single incidence of the maxilla and mandible (Maloney et al., 2001), which permits an easy visualization of all dental elements and their anatomical structures for the dentist, and there is a low dose of emitted radiation for the patient (Devlin & Yuan, 2013). For a perfect visualization of anatomical structures, panoramic radiography should be performed in an extraoral radiographic unit and with a high standard of quality in both the technical procedure as well as in the revelation process (Alkurt et al., 2007).

The panoramic radiography should be achieved by following all manufacturer’s recommendations, and the patient should have to remain perfectly positioned while the X-ray tube and the image receptor simultaneously revolve around the him head (Galiclimidi et al., 1989). About the radiation exposure, the mean of kilovoltage (kVp) and/or
regulation of milliamperes (mA) as recommended by the manufacturer had varied from patient to patient due to size, teeth, color of skin, muscles, and bone structure, among others. On panoramic radiographs, the exposure time is set to allow the device to complete a full turn around for the patient (White & Pharaoh, 2004 and 2014).

The image receptor in an extraoral radiography is a combination of two intensifying screens with a sensor between them. Each intensifying screen has a layer of phosphor that fluoresces when activated by X-radiation, which penetrates the patient and the cassette, which is a compartment where radiographic films are accommodated at the time of radiography (Ludlow & Platin). This fluorescent glow sensitizes the image receptor. This receptor used in panoramic radiography is 10-60 times more sensitive than the fluorescence X-radiation and as the X-ray tube and image receptor surround the patient, the image is recorded on in vertical increments, which are restricted by narrowing the X-ray tube and the collimator (Van Ongeval, 2007).

This examination is indicated in dental practice for allowing a panoramic view of many general anatomical structures of interest to the dentist, and is the dental radiography that facilitates "radiographic findings" in the diagnosis of pathologies (Ramesh et al., 2001).

Panoramic radiography is already part of the routine; for example, the prosthetic planning, whether for diagnosing maxillary changes, the presence of root fragments, foreign bodies, bony ridge height, can also be used for evaluation of systemic conditions (Friedlander et al., 2002). It was found that a significant correlation between changes in the trabecular bone viewed on panoramic radiographs and radiographs of the wrist (carpal) with osteoporosis in the spine and femur detected by bone densitometry (Ciftci et al., 2005). This allows an approach prior to the establishment of complications that can debilitate the quality of life for patients (Taguchi et al., 2006). This imaging test has disadvantages, too, since it is a two-dimensional image and presents distortions that interfere with surgical planning (Correa et al., 2013).

Panoramic radiography is considered useful and practical to complement the clinical examination in the diagnosis of diseases of the teeth, such as endodontic diseases, and diseases of the bones of the face (Rushton & Horner, 1996). Through this examination, the dentist can see all the teeth at once, even those that have not yet erupted. Thus, tooth fractures, infections, or other diseases of the bones that support the teeth can be viewed and often diagnosed (Royal College of Radiologists, 1994). It is possible to search through this exam, situations of bone resorption, and radicular cysts, tumors, inflammations, post-accident fractures, temporomandibular joint disorders and sinusitis. It is common to request it also as a preoperative examination in surgery of the teeth and bones, although Ohman et al. have been considering it insufficient for this analysis (Ohman et al., 2006).

The pediatric dentist can monitor the teeth before they erupt into the oral cavity and can analyze their location, shape, angle and the presence of teeth in excess of the normal number, or agenesis that is missing a tooth germ, and thus prevent or attenuate future aesthetic problems (Peretz et al., 2012).

The main indications of panoramic radiography are the general survey and oral health; provide best subsidies for surgical procedures; initial and progressive evaluation
for orthodontic treatment; information on growth and development in children; reviews about chronological dental eruptions and axes of eruptions of permanent teeth; cystic lesions or neoplastic views; dimensional measurements for implantology; historical documentation of the patients; evaluation of the temporomandibular joint and to detect the presence of foreign bodies (Mahl & Fontanella, 2008).

As we can note, nowadays, with the large amount of supply, radiographic examination are of great importance in the diagnosis of oral alterations, because it allows the professional to gain evidences, together with the clinical examination, a quantity of information that become solid for the process of diagnostics. Therefore, it is essential that professionals perform radiographs surrounded care technicians, starting from the storage of radiographic films, through the processing of these tests, until you reach the stage of interpretation (Choi et al., 2012). Failures during the taking of these tests can lead to erroneous conclusions, causing unnecessary exposure to patients by increasing the need for repeats (Akarslan et al., 2003).

To interpret panoramic radiograph is necessary prior knowledge of anatomy. There are a number of variations, which are shown within the normal range and should be examined carefully before the erroneously determine the presence of anomalies (Ono et al., 2005). Therefore, the radiographic images should be considered carefully.

There are four anatomical plans used for proper patient positioning. The plan or line Atar-tragal, the plan or line orbit/meatus (Frankfurt plan), the plan or line canine/meatus and the median sagittal plan. Devices for head positioning and support for chin are also important for precise positioning. It is a necessary time and explanation to the patient of the purpose and operation of the equipment to a proper position of the patient. It is important instruct the patient to bite the bite block, close the lips, and put the tongue against the roof of the mouth (Narhi et al., 2000). The patient should always use lead aprons covering them.

3 Radiographic Errors of Positioning

Radiographs are considered technically good and those that possess good quality were those presented the following criteria: presence of sharpness or detail, minimal distortion, correct framing sensor in the region, lack of artifacts, density and adequate contrast (Ezoddini et al., 2011). The examinations that don’t present these characteristics demonstrate that some mistake occurred in the moment of the radiographic or during its processing.

The difficulty in the interpretation of radiographs is often correlated to errors in obtaining and interpreting the image. The anatomy of the oral area is rich in features that represent the bone and tooth structures, and these traits are distributed in various directions, forming images that give illusions and overlaps. Coupled to this, there is the inherent technical error. The main errors that may occur in relation to panoramic radiographs are associated with technical errors or processing. In this way, in execution of this radiograph, the care with the positioning of the patient and the processing of steps are essential. Studies indicate that the errors more observed in oral radiology institutes
are positioning errors (Kaviani et al., 2008); meanwhile, those related to exposure factors, errors related to the presence of artifacts and technical errors, in that order.

In this way, positioning errors of patients are most common and a critical factor in the possibility of errors is patient positioning being controlled by the operator (Dhillon et al., 2012).

Between the presentation of mistakes by the operator at the time of positioning patients and handling the film, a common error that can occur is the patient that positions your head in front with the plane of focus. This produces an image in a radiograph with the dental arches, especially the front teeth, located out of focus, with a blurred aspect, shortened and narrowed. Besides that, the premolars overlap and may cause an overlap of the columns on the ramus of the mandible (Choi et al., 2012).

In this another to context, it was shown that incorrect positioning of the patient’s head was responsible for most of the repetitions: the patient’s head was on the front of the plane of focus in 21.15% of cases, turned to the right or left at 24.84 %, inclined forward in 21.21% and positioned behind the plane of focus in 20.30%. When the patient’s head positioned behind the plane of focus, the dental arches, especially the anterior teeth are located outside of focus, looking blurred experiences in expanding along a horizontal direction. The condyles can be designed to the side edges of the image receptor (Passler & Vesser, 2006; Langland & Langlais, 2002). Now, when the patient’s head tilted back, the occlusal plane is flattened or with reverse curve. The apexes of the upper incisors are out of focus. The condyles can be projected out of the imaged area due to an increase in the intercondylar distance.

In this way, it’s possible to observe the occlusal plane with an excessive curvature in panoramic radiographs when patient’s head leaning forward. About this problem, the apex of the lower incisors is out of focus too and there are an overlap image of the hyoid bone in the anterior mandible. The upper region of the condyles may not appear and there is a narrowing of the intercondylar distance (Passler & Vesser, 2006; Langland & Langlais, 2002).

It is very common for the patient to incline or turn the head to the right or left (Dhillon et al., 2012). In the first case, it’s possible to observe the radiographic image in an asymmetric structure (the side to which was the slope seems to have reduced in size compared to the opposite side) and occurs marked overlapping in the proximal surfaces (Figure 2). In the second case, in the other hand, the teeth on one side of the midline appear to have extended and to overlapped the sharp proximal surfaces; whereas, the teeth on the opposite side are shown shortened. The branch from one side of the mandible appears much larger than the other one, and the condyles differ in size.

The chin of the patient and the occlusal plane must be positioned correctly so that distortions are avoided (Ezoddini et al., 2011) (Figure 3). The occlusal plane should be aligned so that it is lower above, angled 20 to 30 degrees below the horizontal plane. One way to position the chin is to place the patient so that the line connecting the tragus of the ear to the outer corner of the eye is parallel to the ground. If the chin is elevated, the occlusal plane on the radiograph appears flattened or inverted, and it creates a distorted image of the jaw. Furthermore, the shadow radiopaque palate bone overlaps the roots of the maxillary teeth. Conversely, if the chin is low, the teeth are too overlapping.
region and the symphysis may be out of the jaw radiography, in addition, both mandibular condyles can be projected out of the upper edge of the image (Sewerin, 1990).

The position of the tongue also has a great influence on the quality of the radiographic image (Akarslan et al., 2003). The absence of tongue contact with the palate is identified by the visualization of a radiolucent band designed at the height of the apex of the upper teeth in a panoramic radiograph. Also, if the tongue is not on the palate (Figure 4) or the lips are open (Figure 5); the air between the parted lips obscures the crowns of the upper and lower teeth. The apical region of the maxillary teeth is obscured by dark air space between the dorsum of the tongue and the hard and soft palates (palatoglossal air spaces). To avoid confusion and compromise our ability to reset
after an analysis above the apices of the central incisors; it’s necessary to ask the patient throughout the radiography that it remains positioned with the tongue stuck to the palate (roof of the mouth) and do not swallow the saliva to prevent movement during radiography (Schiff et al., 1986).

Regarding the posture of the patient, the incorrect column positioned and movement during radiography, can produce a “ghost image” in radiopaque area in the center of the radiography, in the region of the incisors, as well as blurred portions in radiograph and large step defects in inferior border of mandible (Dhillon et al., 2012). A summary of positioning errors and their consequences for the radiographic image can be seen in Table 1.
<table>
<thead>
<tr>
<th>Common Positioning Errors</th>
<th>Description of the Radiographic Obtained Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head positioned behind the plane of focus</td>
<td>Increased and blurred image of the anterior teeth and bone structures of the region, as well as condyles at edge of the film.</td>
</tr>
<tr>
<td>Head positioned forward of the plane of focus</td>
<td>Narrowed and blurred anterior teeth and bone structures of this region plus an overlay image of the spine, visible bilaterally.</td>
</tr>
<tr>
<td>Chin pointing upward</td>
<td>Flattening of the occclusal plane, blurred imaging of the roots of the maxillary anterior teeth, hard palate appears superimposed on the roots of these same teeth and the distance between the condyles is increased on the obtained image.</td>
</tr>
<tr>
<td>Chin pointing down</td>
<td>Roots of the lower anterior teeth appear blurry, there is excessive curvature of the occclusal plane.</td>
</tr>
<tr>
<td>Patient’s head tilted to the left of right</td>
<td>The image appears tilted, so there is unequal distance between the right and left bottom edges and the bottom edge of the film and consequently, the condyles can e loss on top of the film. There is a significant overlap between the approximal surfaces of teeth and structures are asymmetrical, since the side to which the patient has bent the head present smaller structures in the image.</td>
</tr>
<tr>
<td>Patient’s head turned to the left of right</td>
<td>The teeth near the film will appear shortened, while the teeth near the X-ray will be wider and longer on an image like this. The nasal structures are not clear and the left and right mandibular branches as well as condyles differ in size.</td>
</tr>
<tr>
<td>Absence of contact between tongue and palate</td>
<td>Radiolucent shadow projected on the height of the apex of the upper teeth due to palatoglossal airspace.</td>
</tr>
<tr>
<td>Open lips</td>
<td>Radiolucent area in the coronal part of the maxillary and mandibular anterior teeth.</td>
</tr>
<tr>
<td>Incorrect positioning of the patient’s spine</td>
<td>This usually occurs because a low positioning of the patient. It is possible identify a radiopaque area projected on the radiographic central area that protrudes in the region of incivicos.</td>
</tr>
<tr>
<td>Patient movement during exposure</td>
<td>There are distortions of irregularities in all structures, and the image presents a blurred appearance.</td>
</tr>
</tbody>
</table>

**Table 1**: Summary of the positioning errors more common during radiographic technique and their consequences in the image
Radiographic images distorted caused by anatomical structures or objects positioned outside the focal zone is known by several names: reverse shadows, secondary images, pictures attached, double images, triple pictures, shadows, ghosts earrings (cysts), contralateral and ghosting images (Sewerin, 1990). These images, found only on rotational panoramic radiographs, are anatomical structures such as vertebrae, the rami, or the hyoid bone, artificial objects, such as metallic material, dental crowns, wires, plates containment, earrings, necklaces, and machine parts, among others. Therefore, the appearance of ghost images is complex, since the anatomical structures or artificial objects can form multiple images.

### 3.1 Implications of Positioning Errors in Diagnosis

The Panoramic image is a complex projection due to its size and the wide range of anatomic areas. Thus, this technique allows for multiple radiographic distortions and overlapping, which can be exacerbated by technical errors during image acquisition. Furthermore, the wide range of areas can be seen in this x-ray, creating additional challenges for interpretation.

In the field of dentistry, since hard tissues such as teeth and bony structures are mainly targeted in the treatment, a radiographic diagnosis has been widespread and has become a form of routine.

Radiographic examination is an important complement in obtaining a diagnosis of soft and hard tissue lesions, and sometimes becomes the sole means to detect possible residual changes; however, the radiographic interpretation may be impaired when faults are introduced during a radiographic processing (Zubeldia et al., 2003). The protection against unnecessary exposure to X-radiation, also called radiation protection, should be a main concern in order to avoid unnecessary use of radiation, which in practice, also means avoiding the repetition of exposure to radiographs (Moreno, 2011).

The main role of imaging is to evaluate the presence or absence of a disease, its location, and the monitoring of disease’s progression, making the imaging exam an indispensable method in planning the guidelines treatment and assessing its effects. However, images do not always accurately show the condition, nor do they allow total denial of its existence. Therefore, if the disease is diagnosed only by radiographic imaging, there is a possibility of reaching an erroneous diagnosis. On the other hand, by dwelling too much on the clinical view, there is a danger of losing the important aspect of an image. In this way, during the interpretation of an image, it is necessarily a good understanding of the characteristics of each of the methods assessment, in addition to being aware of the limitations of an exam imaging.

A good knowledge of normal anatomy can be quite useful to compare both sides of the image to make a decision that the finding is normal, since the bilateral structures appear are typically anatomic. This comparison between left and right sides also allows recognition of asymmetries that may be indicative of an established pathology or one in development.

There are several restrictions regarding the use of this image as an auxiliary diagnosis. In this sense, it is important to note that for assessing the presence of care, pano-
Panoramic radiography is commonly used for the evaluation of third molars and the temporomandibular joint (TMJ). In the latter case, it has some limitations, since their two-dimensional vision has the easy possibility to present distortions to avoid a detailed analysis of this region. However, there are still other abnormalities of medium to large proportions in TMJs who may be identified in this overview. Still, the panoramic image is so important in checking the edges of an existing lesion, as this enables the vision of all limits of a neoplasm. Thus, the shape, correct location, and conditions of neighboring structures are identifiable characteristics in a panoramic radiograph when detecting pathology.

For specialties in pathology and oral surgery, this tool becomes very important, because the overall configuration of the oral region offered by a dental panoramic radiograph allows you to view apical lesions, impacted or uninterrupted supernumerary teeth, apical fragments, dental cysts, degree of bone resorption, malignant and benign tumors, osteosclerosis, calcification of ligaments estilohioids, ectopic calcification, bone defects, fracture lines, severity of injury and repair of osteopathy (Larheim and Westesson, 2006). The panoramic radiograph is well used in children because has an extra oral examination and is well accepted by them. It becomes possible to identify in these patients the process of eruption and resorption of tooth germs, and the presence of mesiodens, agenesis and odontoids, that could not appear in periapical radiographs. Furthermore, radiography is valuable for an orthodontics examination, since through it, is the possible to compare the positions of all the teeth at different times during the treatment, as well as overall the quality of the teeth against mechanical forces.

Ghost images are very common and happen when errors occurs during the execution of radiographic technique. The structures appear blurred and changed in size, and the professional must be careful not to confuse them with pathological conditions. In this sense, a panoramic radiograph is an important complementary diagnostic test that may be affected by the errors of radiographic positioning as quoted in this chapter. Many of these mistakes generate blurred images, and they can be wrongly diagnosed as a disorder. Moreover, these errors can camouflage the real presence of pathologic features, making it clinically impossible to identify them. The main danger in the presence of these errors is the mishandling of the case and the incorrect treatment decision for the patient. Thus, a radiopaque image caused by overlapping teeth in an incorrect positioning of the patient’s head in radiography can lead to a clinical misdiagnosis of the presence of mesiodens. This same case can cause severe radiolucent jaw, which can be confused with a kind of cyst. In addition, this type of error can cause a large overlap of all structures of the maxillofacial region and you may notice a buildup of radiolucent images in the region appear as paranasal sinuses. In both misinterpretations, driving the
treatment plan can be altered and cause great harm to the patient.

Among the positioning errors during a panoramic radiograph, the wrong positioning of the patient’s head is critical. In this case, it is important to note that the operator can have greater responsibility for this error than the patient himself. This fact may occur due to lack of guidance for the patient and the lack of knowledge of the perfect head position by the professional.

The time spent by the professional in positioning the patient correctly before performing radiography is essential for obtaining an image of suitable quality. Also, instructing the patient regarding the movement of the machine during an application of the method makes it is important to prevent him or her from moving during the procedure for alarm and consequently to avoid positioning errors.

According to previous studies (Ono et al., 2005) some errors are inevitable for some patients due to his physical stature, facial asymmetry or by not following the instructions correctly (Figure 6). So, changes in the image are not always related to distortion or poor positioning of the patient, but rather the presence of asymmetry. According to Ono et al. (Ono et al., 2005), anatomical variations may determinedly different using paper grade radiographic images and, according to Gianni et al. (Gianni et al., 2002), the professional must have this knowledge and take into account such changes to make correct planning, combined with the ability, the expertise and experience of the maxillofacial surgeon for treatment success.

Figure 6: Panoramic Radiograph with patient’s movement during the performance of radiography.

Discrepancies in images are recognized by an increasing lack of sharpness and distortion of anatomical structures that appear clearly in other structures. The specific anatomical relationships in radiography allow to distinguish positioning errors horizon-
Regarding the location of positioning errors, the discrepancies of the posterior focal point id recognize easily. There is an apparent blurring and widening point behind the stern, while at the front focal point, the structures appear shortened and slightly blurred. Both jaws are also distorted by vertical positioning. Already errors in horizontal placement, they distort more maxilla than the mandible. For example, the positions of lifting and lowering the chin respectively widen and shorten the mandible; however, the maxilla and the upper part of the ascending branch of the mandible are distorted more than the body of the same. The discrepancy between both jaws is higher in the elevated position of the chin than in the dropped position, and reflects the differences in the anatomical arrangement of sectors in the focal plane and the direction of the rays. Thus, the anatomical relationships on radiographs provide a guide to differentiate horizontal from vertical positioning errors (Rushton & Horner, 1996).

According to Gomulka (2000), the most common mistake about position is not positioning the tongue against the palate, which normally produces a radiolucent image, which can occur unilaterally, falsely suggesting a pathological condition. Wrong anterior-posterior positioning is another common error (Figure 7), together with opened lips.

![Figure 7: Panoramic Radiographic with wrong anterior-posterior positioning.](image)

Importantly, the severity of the error during radiography can influence more than the amount of these errors. In this context, at the time of an error cripple, in a diagnostic evaluation of radiography, this value shall be an unacceptable diagnosis not contributing to the interpretation of the case. It is possible to say that even if an X-ray contains an error, which may be multiple or not, it can be considered acceptable within the diagnostic value, since this error is small in magnitude; i.e., it is not severe enough to interfere with viewing anatomic structures, allowing us to follow the protocol of interpreta-
tion, without having difficulty in reaching the final diagnosis.

In summary, having a correct diagnosis is crucial, and it is associated by clinical, radiographic and laboratory examinations. The panoramic radiograph shows the importance in most diagnosed cases of oral diseases or abnormalities, and even should be an important resource already during childhood, when this radiographic image can detect abnormalities that may influence the development of a correct occlusion of the future adult. Panoramic radiography can be an important tool to aid in the diagnosis and treatment plan; a correct execution of this technique is essential, and, how we saw in this chapter, most errors are under control of the operator and therefore can be completely eliminated by attention to details.

4 Conclusion

In conclusion, patient positioning errors are the type of mistake most frequent in panoramic radiographs, and to decrease them, the professional needs to know them, understand their consequences and then seeking solutions and necessary corrections. Given the importance of this radiograph as a complementary instrument to define an oral diagnosis, it is fundamental to avoid positioning errors of patient during development of radiograph performance. This care can prevent mistakes and the evaluation of possible oral problems, as well, as can avoid an incorrect treatment.

Acknowledgements

The authors would like to thank Radio Center, a dental radiology center by allowing the performances of the radiographs images presented in this chapter.

References


