SEMI-ADJUSTABLE ARTICULATORS

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Received: 03/15/2014; **Accepted:** 03/29/2014

ABSTRACT

The semi-adjustable articulator (SAA) plays an important role in Dentistry, since it allows adequate diagnosis and treatment planning to promote the oral health of our patients. The SAA reduces the intervention of prosthodontists; when well employed, it simplifies the daily clinical routine, reducing the number of sessions, chair time and need of interventions in the patient's mouth, besides allowing more accurate procedures, consequently without damages to the stomatognathic system.

KEYWORDS: semi-adjustable articulator, verticulator, articulator mounting, articulator parts.

1. INTRODUCTION

In dental practice, it is noticed that dental professionals usually conduct diagnosis only by oral examination, with aid of dental mirror and dental probe, often not performing radiographic examination.

Diagnosis in Dentistry is the basis for correct intervention and treatment success. With regard to prosthodontics, some auxiliary diagnostic methods are extremely importance to enhance the establishment of precise treatment planning, including the utilization of articulators.

There has been concern with the reproduction of maxillomandibular relationship for more than one hundred years, in an attempt to allow dentists to have a copy image of the patient's mouth in their hands. The articulators were designed for that purpose.

The articulator was designed to allow fixation of dental casts for recording of intermaxillary relationships and reproduction of mandibular movements of interest in prosthodontics.

With the evolution of materials, researches and technology, the semi-adjustable articulator (SAA) became increasingly correct as to the accuracy of reproduction. This appliance is highly advantageous for dental professionals in modern dentistry.

The SAA also presents some limitations inherent to their mechanical nature, due to the lack of muscles, ligaments, nerves, emotional and biological factors, aspects related to living beings and proprioceptive memory; these limitations should be taken into account to avoid mistakes.

When employed by an operator with good technical dexterity, under accurate clinical criteria, skillful hands and good biomechanical knowledge, the articulator is very useful and presents a good work-cost relationship. It may allow time saving, since an apparently complex case may be easy to solve and have a good prognosis after proper mounting and analysis with the SAA.

It has been statistically demonstrated that the SAA is a practical instrument, with proven veracity and fidelity. Its utilization reduces the number of intraoral interventions, since most occlusal adjustments might be performed directly on the articulator.

Its utilization has become fundamental for dental professionals in current practice, since it allows easy achievement of more accurate works without further damage to the stomatognathic system.

2. MATERIAL AND METHODS

The following literature databases were searched: General Science Index, Medline, Pubmed, EBSCO host and CAPES Periodicals. Studies were selected if they scope were directly related to semi-adjustable articulators. Studies published from 1910 to 2012 were included according to the author's analysis. The keywords of this study were utilized to the consult the databases.

3. LITERATURA REVIEW

Villa (1952)[1], recounts in his book, the emergence of the first models of articulators, according to it, Ga-

riot, in 1805, was the first author to articulate maxillary and mandibular dental casts to maintain the vertical dimension of occlusion. This author also introduced the guiding planes to record the vertical dimension of occlusion. Evan, in 1840, presented a type of articulator that was able to reproduce lateral mandibular movements, with a mobile lower member and fixed upper member. Bonwill, in 1858, described the mandibular condyle movement in horizontal, postero-anterior direction during mouth opening. This author presented a type of articulator that reproduced the lateral mandibular movements together with the horizontal condylar movement. Walker, in 1896, demonstrated the theory of condylar movement during mouth opening, timely correcting the mistake of Bonwill (1858). According to Walker, the condyle presented forward and downward displacement during mouth opening, following the inclination of the glenoid cavity. His anatomical articulator was able to reproduce these movements. Snow, in 1900, introduced the facebow for utilization with the articulator, with a view to transfer the guiding planes from the patient's mouth to the articulator, following the condyle-incisor distance.

Gysi (1910)[2], invented a unique articulator, which had a device adapted incisal guide. This instrument was very advanced for the time, and presented as a novelty the possibility of extra-oral records, however this articulator was not well accepted by professionals of the time, so the surging Gysi Simplex.

Marchetti *et al.* (1980)[3] assigned the term "mechanical examination" to the analysis of dental casts mounted on SAA, defining it as the mounting of maxillary and mandibular dental casts in an appliance that reproduces the mandibular movements. This procedure is fundamental for treatment planning, since it allows the analysis of opposing teeth and the efforts applied to them.

Tamaki (1981)[4] stated that the SAA reproduces the mandibular movements with nearly complete accuracy and thus are the most indicated in Dentistry, due to the need of short chair time to adjust it.

Motsch (1985)[5] states that premature contacts may not be detected by direct occlusal analysis on the patient's mouth, especially if these contacts involve teeth with mobility, which may be displaced or intruded; conversely, on the SAA, these contacts are more evident due to the rigidity of dental casts.

According to Posselt (1981)[6], Santos (1996)[7], Mezzomo (1994)[8] and koyano (2012)[9], successful diagnosis and treatment depend on the good sense and dexterity of dental professionals. The SAA is employed as an auxiliary tool and may only be successfully used if the dental professional is familiarized with the principles of occlusion and mandibular recording.

Ash & Ramfjord (1987)[10] mentioned that the articulator is a mechanical instrument used to connect maxillary and mandibular dental casts of patients, so as diagnostic and restorative procedures may be conducted without the presence of the patient.

According to Stiz (1994)[11], the non-utilization of dental casts mounted on SAA as an auxiliary tool for diagnosis may impair the analysis and conclusions on the oral health status of the patient. This occurs because the teeth are dynamic organs closely related with the soft tissues, bones, joints and ligaments; they also reflect the general health status of the patient.

Fonseca (1994)[12] highlights that "*patients with severe craniomandibular dysfunction are often submitted to general dental treatments without diagnosis of their condition by the dental professional*".

According to Koyano (2012)[9], the SAA is a mechanical appliance that allows adaptation of maxillary and mandibular dental casts of patients, with simulation of the temporomandibular junction and reproduction of some mandibular movements that are fundamental for satisfactory occlusion.

Starcker (2010)[13], reported some advantages of the SAA, including the possibility to reproduce mandibular movements without interference from the neuromuscular system; general visualization of teeth and adjacent structures, especially at the region of second molars, which are often difficult to observe in the presence of soft tissues. However, this author highlights that mounting of dental casts should be careful to allow accurate reproduction of the patient's status.

Souza *et al.* (2001)[14] mentioned the low quality of Wip-Mix (SAA) articulators, whose pieces and components are fabricated with plastic, which often leads to fracture of components due to the low quality of the material and insufficient quality control during fabrication.

Lopes *et al.* (2003)[15] stated that accurate transfer of maxillomandibular relationship from the patient to the articulator depends on several variables, especially the type of articulator employed, technique adopted to transfer the spatial positioning of the maxillary dental cast to the articulator, ability and experience of the operator, accuracy of materials and recording technique, besides the type of material and technique employed for fixation of dental casts to the upper and lower members of the articulator.

Amorin *et al.* (2004)[16] described that patients receiving complete dentures fabricated with aid of articulators report greater comfort and increased masticatory efficiency, better adaptation to the new dentures, and reduced occurrence of soft tissue lesions.

Mounting of dental casts on SAA allows the achievement of several data, such as clear observation

of edentulous spaces and their extent, occluso-gingival height, dental arch curvature, postero-anterior view of dental casts, absence or presence of muscles and ligaments, which may not be noticed during clinical examination of the patient.

The utilization of SAA provides easy observation and treatment planning, allowing the dental professional to perform an assay outside the mouth, foreseeing the probable diagnosis and significantly reducing the risk of iatrogeny.

It should be remembered that the SAA is a valuable instrument for dental professionals, yet it is not a miraculous and failure-proof tool; thus, the possibilities of utilization depend on the professionals handling and caring for this instrument.

Classification of articulators

According to Weinberg (1963 apud TAMAKI 1981[4]), the articulators may be classified into four categories: arbitrary, positional, semi-adjustable and fully adjustable.

- The arbitrary articulator is based on the theories of Monson or Hall. The mobile member is connected to the body by a central point, which allows pendular movements of the member;
- The positional articulator is based on the theory of immutability of vertical dimension. It is characterized by the independence between the upper and lower members.
- The semi-adjustable articulator allows the following adjustments: inclination of condylar path, Bennett angle and incisal path. These articulators include the Gysi, Trubyte and Hanau model H.
- The fully adjustable articulator allows the following settings: inclination of condylar path, Bennett angle, Fischer angle, incisal path, height of pints and intercondylar distance (examples: articulators of Stuart and Di Pietro).

The articulators may be classified as non-adjustable (NAA), fully adjustable (FAA) and semi-adjustable (SAA). The non-adjustable articulators include the simple hinge articulator, the verticulator and the correlator, whose movements and characteristics do not allow reproduction of mandibular movements. One limitation of the simple hinge articulator is the impossibility of lateral movement, associated with an incorrect path of opening and closure compared to the mandible, leading to altered positioning of cusps and consequently to the occurrence of premature contacts when the restoration is placed in the mouth.

These non-adjustable instruments may be employed for single-tooth restorations, in which occasional occlusal changes in the prosthesis may be corrected directly in the patient's mouth, without damage to the chair time and quality of the prosthesis. Thus, the SAA and FAA are better recommended for mounting of dental casts or fabrication of extensive prostheses.

The verticulator and correlator only allow movements in vertical direction; the verticulator is used for mounting of partial dental casts, whereas the correlator may be used with full dental casts.

The advent of FAA was based on the concepts of Gnathology, which considers the reproduction of all mandibular movements as fundamental in prosthodontics. These articulators are able to reproduce all determinants of occlusal morphology and thus allow the achievement of prostheses that are more compatible with the actual status of the patient. This is very important to reduce the chair time required for occlusal adjustment of prostheses.

The problem with the acceptance of FAA is related to the complex mounting and high cost of these articulators. Therefore, due to the appearance and optimization of SAA, its utilization has been reduced, even though it is recommended by many clinicians and researchers.

The SAA, whose initial prototype was the Whip-Mix articulator, is able to partially reproduce the determinants of occlusal morphology. Therefore, they present limitations when compared to the FAA; however, these limitations may be compensated for and thus the prostheses fabricated with aid of SAA are compatible with those achieved with aid of FAA. This fact, combined to the simple mounting, has currently made the SAA the instrument of choice for most cases. As mentioned by Shavel, "*a dentist can do a full-mouth rehab case on a semi-adjustable articulator as long as he has a fully adjustable brain*".

Such SAA may also be divided into ArCon (condyles on the lower member, e.g. Whip-Mix, Denar, Bio-Art, Gnatus, etc.) or non-ArCon (condyles on the upper member, e.g. Dentatus, Hanau).

Articulator parts

Body – central portion to which the members are fixated. Its function is to establish the bicondylar distance and the distance between the members.

Members – horizontal extensions on which the mounting guides and plates are fixated.

Condylar balls – represent the condyles, with small, medium or large intercondylar distance.

Angulation of the glenoid cavity roof – guides the protrusion movements of the articulator.

Condylar housing – guides the protrusion movements of the articulator.

Incisor table – located at the anterior portion of the lower member; provides support to the incisal pin.

Incisal pin – is supported on the incisal table and

maintains the height between the members.

Mounting plates – receive application of plaster for fixation of dental casts to the articulator.

Facebow – accessory device employed for mounting of the maxillary dental cast in the articulator and establishment of intercondylar distance (S, M, L).

Nose piece – stabilizes the assembly on the basis of the Nasion point (glabella).

Bitefork – Allows registration of indentation.

Working positions: centric relation (CR) and maximum intercuspation (MI)

Before description of the occlusal recording techniques, the position to be adopted for mounting of dental casts on the SAA should be discussed. That is to say, the first step before occlusal recording is the definition of the maxillomandibular position.

Different clinical situations influence the selection of mandibular positioning. Thus, it may be stated that the main factor for selection of positioning would be the occlusal stability.

When fixed dentures or single-tooth restorations are fabricated and there is occlusal stability, the maximum intercuspation position (MI) of the patient may be considered for recording and for the prosthesis. Recording in MI follows the mechanism of neurological perception of the periodontal ligament of teeth normally occluding at the opposite side. This allows maintenance of the patient's vertical dimension of occlusion and also compensates for some limitations of the SAA.

In fact, in such cases, the best situation would be if recording was unnecessary, i.e. if the occlusal stability of dental casts is enough to eliminate the need of further recording. The dental casts are then directly mounted against each other, after removal of occasional bubbles form the surface of dental casts. This is common in the fabrication of single-tooth restorations and unilateral fixed dentures with stable dental casts. In these cases, the maxillary dental cast is conventionally mounted with aid of the facebow, and the mandibular dental cast is manually positioned in intercuspation against the maxillary dental arch.

After fabrication of the prosthesis and during adjustment in the patient's mouth, the professional should avoid the introduction of "new" premature contacts in centric relation or during mandibular movement. Such contacts should be eliminated only by adjustments on the prosthesis.

On the other hand, in cases of extensive oral rehabilitation, with periodontal problems or loss of occlusion dimension, the occlusal stability may be absent or the occlusion may interfere with the health of the stomatognathic system. In these cases, since the pathologies are directly related with the occlusion, the MI should not be adopted for the prosthesis.

Therefore, these cases require utilization of condylar positioning for establishment of the working position. This condylar position is the centric relation (CR); after being adopted as working position, it should be harmonious with the dental relationship. Thus, if CR is to be adopted as a therapeutic position, occlusal adjustment of remaining teeth is required for achievement of a stable occlusion. This new maxillomandibular position, in which the tooth contacts are harmonious with the condylar position in centric relation (CR), is called "centric relation occlusion (CRO)".

After establishment of the maxillomandibular relationship, two factors should be considered for interoccusal recording: the recording material and the care to be taken to compensate for the limitations of SAA.

Limitations of SAA and their compensations

As previously mentioned, some limitations of the SAA impair the reproduction of all characteristics observed in the temporomandibular joint, which consequently should be acknowledged and compensated for to improve the final occlusal outcome of the prosthesis.

The influence of these limitations is often related with three occlusal aspects: direction of ridges and grooves, cusp height and fossa depth, and conformation of the palatal cavity of anterior teeth.

Several limitations and compensations of SAA are described in the literature, the most important of which will be described in this section.

Shape and angulation of the articular eminence

Limitation: the upper wall of the "mandibular cavity" of the SAA is straight and rigid, whereas this structure in the TMJ is curved. That is to say, only the initial and final positions of mandibular movement are recorded. Therefore, the actual paths of the condyles are not accurately recorded on the SAA. Consequently, carving of the occlusal surface of posterior teeth increases the risk of occurrence of undesirable contacts during mandibular movements.

Compensation: customization of the anterior guidance while the provisional crowns are worn and its transfer to the incisal table on the articulator reduces the possibility of contacts between the posterior teeth during excursive mandibular movements. This customization guides the establishment of cusp height and fossa depth. These clinical procedures are described in the section on provisional crowns.

Recording of intercondylar distance

Limitation: the SAA records only three intercon-

dylar distances (small, medium and large), whereas the patients may present different variations in these distances. According to the determinants of occlusal morphology, this factor is known to influence the direction of ridges and grooves of posterior teeth and the conformation of the palatal cavity of anterior teeth. Thus, occlusal interferences may be incorporated in prostheses if this factor is not compensated for.

Compensation: customization of anterior guidance.

Immediate lateral displacement

Limitation: in many situations, the condyle at the non-working side exhibits mild movement in lateral direction before contacting the medial wall of the mandibular fossa and initiating its downward, forward and inward movement. This characteristic is observed in nearly half of the population and has been called immediate lateral displacement.

In the SAA, the condylar ball is in close contact with the medial wall of the metallic mandibular fossa and thus is unable to reproduce these characteristics.

When present, the immediate lateral displacement may influence the cusp height and fossa depth.

Compensation: customization of anterior guidance. Prostheses with metallic occlusal surfaces may be submitted to surface treatment with aluminum oxide sandblasting before provisional cementation; this procedure allows the identification of occasional interferences, which will be noticed as shiny spots and should be eliminated before definitive cementation.

Position of mandibular rotation axis

Limitation: the rotation axis transferred to the SAA by the facebow does not correspond to the actual rotation axis present on the condyles. Thus, there may be differences in the opening and closure paths between the articulator and the mandible, which will influence the correct positioning of cusps and posterior teeth in the prostheses.

Compensation: interocclusal recording in vertical dimension of occlusion for mounting of dental casts, or occlusal recording with minimum thickness for dental casts mounted in centric relation.

Materials employed

The materials most commonly employed for intermaxillary recording include waxes, addition and condensation silicones and acrylic resin.

For mounting of dental casts in centric relation, wax or addition silicone may be employed for intermaxillary recording, since these cases require a mild separation between the teeth to record only the condylar position. On the other hand, resin copings are preferable for intermaxillary recording for dental casts mounted in vertical dimension of occlusion.

Recording techniques for study and working casts

The utilization of articulators aims to simulate the mandibular movements and reduce the time spent for intraoral adjustment of prostheses. However, the clinical relevance of articulators is directly associated with the accuracy of interocclusal relation of dental casts mounted on the articulator. When mounting of dental casts on the articulator does not correspond to the occlusal relation of the patient, there will be little benefit from its use. Thus, the ability of professionals to mount the dental casts has more influence on the final quality of the restoration than complete setting of semi-adjustable articulators. Besides saving chair time, more accurate records reduce the possibility of restorations without occlusal contact or requiring excessive adjustment. However, some discrepancy in interocclusal recording is expected, related both to the materials employed and to the several clinical difficulties. Despite of that, these errors should be reduced by careful selection and achievement of recordings among the several methods and materials available for that purpose.

Mounting of study casts on SAA

Since the main semi-adjustable articulators commercially available are similar to the Whip-mix, description of the technique for mounting of dental casts will follow the rules established for this type of articulator; they may also be adapted for application with other articulators.

Mounting of maxillary cast with facebow

The facebow allows mounting of the maxillary dental cast on the SAA at the same spatial positioning of the maxilla in relation to the skull. It also allows transfer of the patient's intercondylar distance and rotation axis of the condyles to the articulator.

Assunção *et al.* (2000)[17] reported that the operator influences the final outcome of mounting of maxillary dental casts on the articulator. The possible occlusal changes induced by the professional when mounting the maxillary dental cast on the articulator are not very relevant in the fabrication of complete removable dentures, since they act as a unit supported by resilient mucosa. The errors produced during mounting and transfer of the maxillary dental cast to the articulator with aid of an arbitrary facebow are related to the inherent limitations of the appliances and techniques, as well as to the inability of the operator to use these instruments.

The facebow is positioned by placing the bite-fork in the patient's mouth with three portions of low fusing impression compound, being one at the anterior region and two at the posterior region. The bite-fork is

placed in the patient's mouth with its handle following the patient's facial midline, molding only the cusp tips and incisal edges of maxillary teeth. After cooling of the impression compound, the bite-fork is removed, the molding is checked and the excess impression compound is removed, maintaining only the areas with molding of cusp tips, to allow complete seating of the dental cast. If this does not occur, these moldings may be enhanced with zinc oxide-eugenol paste or similar materials.

The bite-fork is placed in the mouth and should be stabilized during placement of the facebow. For that purpose, three portions of low fusing impression compound are also placed on the lower portion of the bite-fork, so that the mandibular teeth may keep it stable. Cotton rolls or the patient's hands may also be helpful for this purpose. The facebow is then positioned and connected to the bite-fork handle, keeping them closer. Following, the ear pieces are introduced in the patient's external ears; the patient is asked to keep the position of the facebow by applying a gentle forward and upward pressure with the hands, to keep it as close as possible to the condyles. The third point of the facebow, namely the nose piece, is then fixated to the transverse bar of the facebow. At this step, the intercondylar distance is classified as small, medium or large, as indicated on the frontal portion of the facebow by the letters S, M, L, or by the numbers 1, 2, 3, depending on the brand of articulator.

The facebow is removed by loosening the central screw at the center of the transverse bar and asking the patient to slowly open the mouth.

For mounting of the maxillary dental cast on the articulator, the condylar balls simulating the condyles of the TMJ present three positions for mounting, according to the intercondylar distance established by the facebow. Adjustment is performed by utilization of spacers on the condylar guidance: no spacer for the small, one spacer for the medium, and two spacers for the large intercondylar distance. The chamfered aspect of the spacer should be turned toward the condylar guidance.

After screwing the mounting plate to the upper member of the articulator, the facebow is positioned against the articulator body with one hand and held by the other hand; the rods on the external aspects of condylar guidance are placed in holes in the ear pieces and the pin is tightened. For mounting of the maxillary dental cast, the pin should be removed from the upper member of the articulator and the dental cast is positioned following the molding of cusp tips on the bite-fork, to avoid its vertical movement.

The dental cast is fixated to the mounting plate with a small amount of special plaster complemented with stone; the facebow is then removed and the incisal pin is placed with the rounded end contacting the incisal table, keeping the upper member against the lower member.

Zanetti & Ribas (2001)[18] developed a transfer tray in an attempt to simplify and improve the accuracy of mounting of the maxillary dental cast on the articulator. This allows transfer of maxillary arch recordings to the articulator in a single step, without the need of recording bases and guiding planes, by utilization of the bite-fork associated with the tray, in which molding is achieved and transferred by the tray on the facebow.

Mounting of mandibular dental cast and recording of CR

Since the centric relation (CR) is a craniomandibular position not related with the teeth, recording of this position should be achieved with the teeth separated as minimally as possible, to compensate for the first limitation of the SAA.

This is facilitated by direct placement of a chemically cured acrylic resin jig in the mouth, involving the maxillary central incisors and extending up to 2 cm in palatal direction; this jig aims to release the memory of mechanoreceptors in the periodontal ligament and thus enhance the mandibular manipulation in centric relation. The teeth should be lubricated with petroleum jelly or isolated with aluminum foil to avoid the adhesion of resin on them; the resin should be placed during the plastic phase and the mandible should be guided into centric relation position during polymerization.

After finishing, the jig should be stable and present only one contact point with only one opposing tooth, allowing minimum separation of posterior teeth.

Accorsi (2001)[19] described the utilization of acetate sheets (leaf gauge) to help in mandibular positioning in CR. Since then, due to its simplicity, this technique has been diffused and is currently widely employed for achievement of interocclusal recording and accomplishment of occlusal adjustment. It has been used not only for oral rehabilitation, such as by orthodontists and prosthodontists, but also in undergraduate and graduate courses in Dentistry. This author reported that the variations among operators observed in this technique suggest that its validity is doubtful and that the operator should be intensively trained, especially for mandibular manipulation, thus demonstrating its limitation for the achievement of a true, stable mandibular centric relation. The method described by Long comprises placement of acetate sheets (leaf "gauge") in sufficient number to separate the posterior teeth.

Santos (1996)[7] described that Dawson's bilateral manipulation method would be the most recommend-

ed. In this technique, the thumbs are placed on the patient's chin and the other fingers are placed under the mandibular base. The patient is placed in supine position with the professional behind the head; the professional then stabilizes the patient's head against the abdomen and guides opening and closure movements.

The teeth should gently press the mandible upwards, so that the condyles are more superiorly positioned against the articular eminence, with the articular disc interposed between these structures; the movement should be slow, gentle and no greater than 2 cm, allowing the condyles to perform only the rotation movement. During manipulation, the patient should not feel any symptoms in the temporomandibular joint; if this occurs, the pathology should be treated before the procedures for centric relation recording are conducted.

Jankelson & Radke (1978)[20] mentioned that simple mandibular manipulation into centric relation without any concern with the tension and stress applied on the neuromuscular elements of the stomatognathic system is an improper procedure, since muscle relaxation is a pre-requirement for achievement of a comfortable occlusal position for the patient, consequently keeping the relaxation and harmony of muscles.

When the mandible is manipulated into centric relation without utilization of the jig, the first tooth contact corresponds to the centric relation position. If the operator presses the mandible beyond these contacts, it will slide in anterior and/or lateral direction up to maximum intercuspation. The first centric contact should be identified with acetate and articulating paper, to check the accuracy of mounting of dental casts in CR.

Recording is obtained with softened wax, addition silicone or chemically cured acrylic resin in the mouth; it is then placed on the maxillary dental cast and the mandibular dental cast is positioned against the recording with the articulator turned upside down; both should be joined with elastics or wood sticks fixated on the dental casts with low fusing impression compound or sticky wax.

At this stage, the incisal pin should be increased in 1 to 2 mm to compensate for the thickness of recording; the incisal pin is then unscrewed after stone setting, allowing the teeth to occlude in centric relation position, with the upper member of the articulator parallel to the lower member.

During mounting of dental casts in centric relation, the condylar balls should be correctly and passively placed in the condylar guidance, i.e. at the intersection between the lateral and posterior walls; to avoid this, the condylar balls may be locked by tightening the screw of the lateral rod of the condylar guidance, moved in opposite direction.

After stone setting, the guidance should be set to average values, i.e. 30º for antero-posterior inclination and 15º for the Bennett angle. So far, no scientific studies have demonstrated that customization of these guidance might be more beneficial to the final outcome of prostheses than setting to average values.

After mounting of dental casts on the SAA, the most important step is to check the agreement of occlusal contacts in centric relation position between the dental casts and the mouth. For that purpose, the teeth presenting contacts in this position are initially checked with aid of acetate sheets and identified with articulating paper. These procedures are then repeated in the mouth; if there is no agreement, recording and mounting on the articulator should be repeated.

Mounting of dental casts in centric relation position on the SAA is then completed, with a view to enhance the visualization of maxillomandibular relationship and analyze the presence of premature contacts and mandibular deviation in lateral and/or anterior direction.

4. CONCLUSION

Several authors highlight the importance of utilization of articulators in dental practice.

Dental professionals should always make use of articulators in cases of extensive oral rehabilitation, since this may interfere with the mastication of patients and cause even greater damage, instead of solving any existing problem.

The increased experience with utilization of this appliance increases the technical skills, facilitating the diagnosis of occasional problems that might remain undiagnosed by the dental professional if only clinical oral examination was performed.

Due to the several types of articulators commercially available, dental professionals should select their appliances on the basis of suitability to their needs and easy handling; also, the manufacturer's instructions should be followed for achievement of all benefits provided by these appliances.

Considering these facilities, and the rich information provided by SAA, in many cases its utilization is fundamental for treatment planning, allowing assessment, establishment of the probable prognosis and significant reduction in the risk of iatrogeny. However, according to Posselt (1981)[6], Santos (1996)[7], Mezzomo (1994)[8] and Tannmala (2012)[21], successful diagnosis and treatment depend on the clinical criteria and dexterity of dental professionals. The SAA is an auxiliary tool and may only be successfully applied if the professional is familiarized with the principles of occlusion and mandibular recording.

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