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Dr. Pablo Echarri
Director de ATHENEA DENTAL INSTITUTE

For this new issue of Athenea Dental Institute Journal we have prepared 5 new cases that we hope you will find useful in your practice. Dr. Carla Maria Melleiro Gimenez together with Dr. Francisco Antonio Bertoz and Dr. Andre Pinheiro de Magalhães Bertoz send us two case reports of Class II treatment in two different ways: a compensatory treatment case using self-ligation brackets and and another case treated with extractions and anchorage using microimplants.

Doctors Roberto Carlos Lenarduzzi and Javiera Bongiorno send us a case of orthodontic treatment combined with orthognatic surgery. In this case the transverse diameter of the mandible is surgically reduced by the surgical technique of the author himself.

On the other hand, Dr. Pablo Echarri, Dr. Miguel Angel Pérez Campoy and Dr. Javier Echarri also publish two case reports: Class III treatment with anterior traction maxilla using the face mask as anchorage and mandibular distalization with microimplants, and the second case report, the treatment of the lateral open bite.

Since September, we have been very active in Athenea Dental Institute:

- **In Spain:**
  - The fifth edition of Master of Orthodontics and Dentofacial Orthopedics has started.
  - The second year of the fourth edition of Master of Orthodontics has resumed their activities.
  - The students of the third edition have retaken their clinical practice which couldn't be done during the lockdown.
  - The second year of the second edition of the Master of Implantology has started.
  - In October we start with the Expertise in Orthodontics and Dentofacial Orthopedics course.
  - In November a theoretical-practical course on the MARPE technique is scheduled.
  - In January 2021 the third edition of the Master of Implantology will begin.
- **In Poland:**
  - The classes of the second year, third edition of Master of Orthodontics are held, and they will graduate in December 2020.
  - The classes of fourth edition of Master of Orthodontics are held, too.
  - The classes of the first edition of Master of Implantology are held.
  - In January 2021, the fifth edition of the Master of Orthodontics will begin.
  - In March 2021 the second edition of the Master of Implantology will begin.
  - In March 2021 the first edition of the Interdisciplinary Master of Orthodontics and Dentofacial Orthopedics will begin.
  - In September 2021 the Expertise in Orthodontics and Dentofacial Orthopedics course will begin in Warsaw.
- **In Portugal:**
  - The Expertise in Orthodontics and Dentofacial Orthopedics course starts in November in the city of Oporto.

On the other hand, we are preparing two more volumes of the CSW book collection:

- Volume 6: Treatment without extractions, volume 2: Expansion, separation and protrusion.
- Volume 7: Treatment without extractions, volume 3: Distalization and stripping.

I send a warm greeting and my best wishes to all of you, take care of your health and stay safe.

Pablo Echarri

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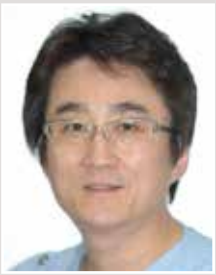
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Compensatory treatment of severe Class II with self-ligating brackets mechanics

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INTRODUCTION

Class II malocclusion is undoubtedly the most common problem in the orthodontics office routine, which requires an adequate differential diagnosis of the structures involved, as well as of their severity, to be able to define an effective treatment plan.

In this context, self-ligating brackets represent an excellent treatment option, as the light force mechanics provide low friction and easier sliding, expanding the limits of quick and safe orthodontic correction.

The purpose of this clinical case is to highlight the biomechanics used to allow non-extraction treatment of severe Class II case, as well as to explain important considerations regarding diagnosis and planning.

CASE REPORT

A 16-year-old patient with bilateral Class II malocclusion (molars, canines and bicuspids), marked overjet, moderate anteroinferior crowding, narrow maxilla (triangular shape), deep bite, mandibular retrusion, and convex profile.

Due to the severity of Class II and facial alterations, an orthodontic treatment combined with orthognatic surgery was proposed. However, the patient and his legal guardians did not accept this treatment option, so a compensatory treatment with extractions of the upper first bicuspids and Class II mechanics with microimplants and intermaxillary elastics was proposed, which was also rejected. Faced with this challenge, we decided to use self-ligating brackets with light forces and low friction, with Class II intermaxillary elastics.

The objectives of the treatment were: to correct the Class II malocclusion and the increased protrusion, allowing the Class I relationship; to improve the deep bite, to allow the dentoalveolar expansion of the maxilla by changing its shape, to correct the antero-inferior crowding, to close the gap between 11 and 21 and to improve the facial profile as much as possible.

Self-ligating brackets (Aditeck) were used. Biomechanics was developed through the following steps:

- Alignment and leveling with controlled dentoalveolar expansion, through the coordination of the maxilla and mandible.

Figs. 1a, b and c. Initial extraoral photographs.

Figs. 2a, b and c. Initial intraoral photographs.

Fig. 3. Initial occlusal photographs.

Fig. 4. Initial panoramic X-ray.

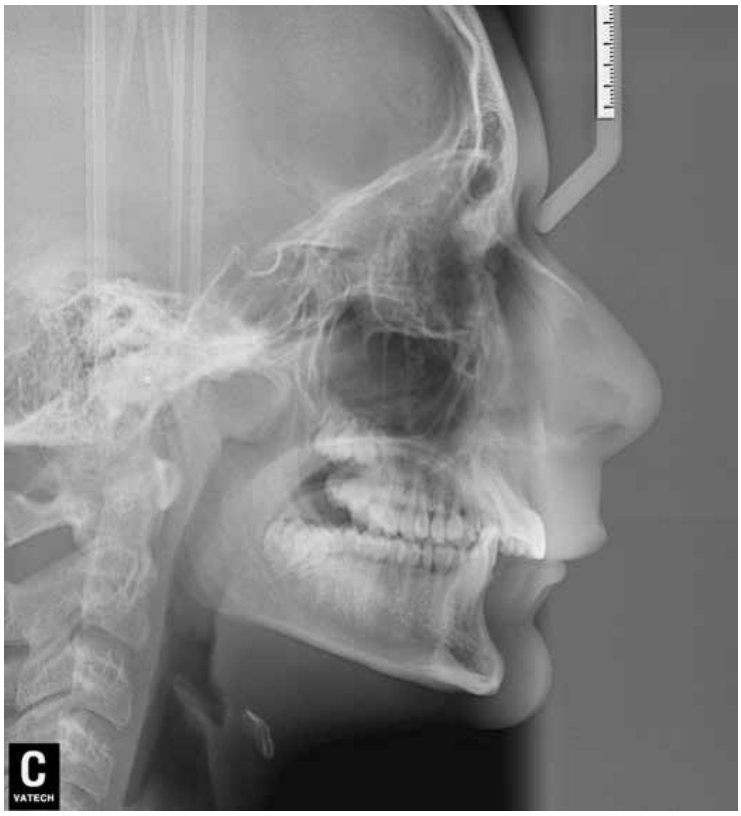

Fig. 5. Initial lateral X-ray..

- Stripping from lower canine to lower canine.
- Use of Class II elastics and intercuspation.
- Class II mechanics.
- Correction of diastema between 11 and 21.

The sequence of arches we used was:

- .012 ”Copper-NiTi
- .014 ”Copper-NiTi
- .016 ”TMA
- .016 ”x.022” TMA
- .018”x.025” SS

RESULTS

The results obtained in 14 months of treatment were satisfactory; they contributed to the esthetics of the smile and the face, and provided conditions for functional occlusion. It was possible to achieve the satisfactory correction of Class II and increased overjet, the adequate torque control, the shape of the maxilla improved significantly, the intercanine distance was respected, the diastema between 11 and 21 was closed and the lower crowding corrected. It is also important to highlight that periodontal condition was improved.

Figs. 6a, b and c. Intermediate extraoral photographs.

Figs. 7a, b and c.Intermediate intraoral photographs.

Figs. 8a and b. Intermediate occlusal photographs.

Figs. 9a, b and c. Final extraoral photographs.

Figs. 10a, b and c. Final frontal and lateral intraoral photographs.

Figs. 11a and b. Final occlusal photographs.

Fig. 12. Final panoramic X-ray.

Fig. 13. Final lateral X-ray.

Fig. 14. Comparison of initial and final frontal and lateral views.

Fig. 15. Comparison of initial and final occlusal view.

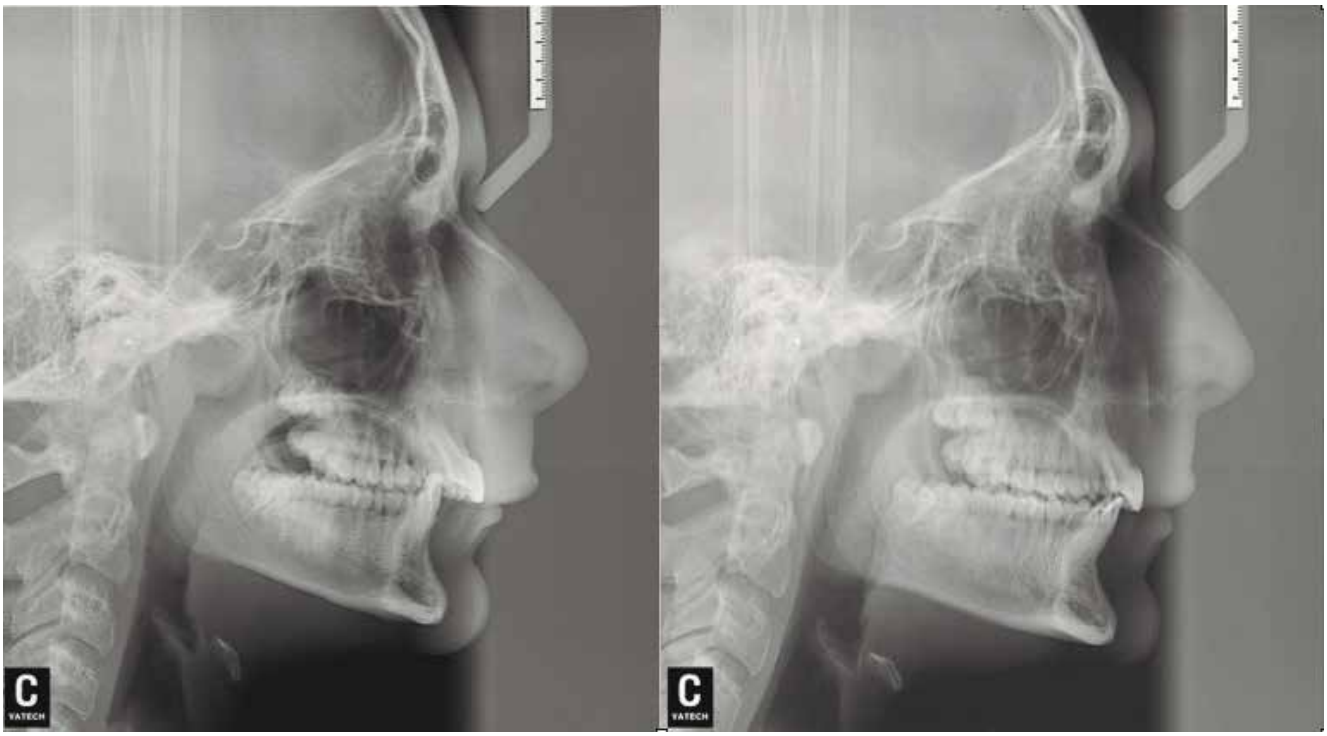

Fig. 16. Comparison of the initial and final X-rays.

CONCLUSIONS

Compensatory treatment with self-ligating brackets and Class II mechanics with elastics proved to be efficient with the advantages regarding the treatment time, torque control, incisor positioning in bony bases and the possibility of a controlled expansion thanks to light forces and low friction.

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Clinical case: Mandibular middle vertical segmentation in a patient with positive dentoalveolar discrepancy

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COLLABORATORS

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Dr. Antonella Lenarduzzi

ABSTRACT

A 35-year-old female patient with interdisciplinary orthodontic treatment and orthognathic surgery need the correction of positive dentoalveolar discrepancy associated with skeletal class III dentofacial dimorphism, with mandibular excess and marked asymmetry. The presence of spaces, especially in the mandible, affects the relationship of the upper and lower jaw, presenting an anterior cross bite. From an orthodontic point of view, various possibilities for solving the positive discrepancy case are presented: from compensations due to alteration of the dental jaw, modifications in the mesiodistal diameter (axial angulations of anterior teeth jointly or individually), and aesthetic prosthetic restorations.

An orthodontic-surgical treatment is also considered in order to resolve the case, and the diagnostic protocol is followed, including photographs, patient models, lateral X-rays of a scull, panoramic X-rays, cephalometric studies and Dicom images with the aim of carrying out virtual three-dimensional planning using a Dolphin software to establish the procedure to follow.

Regarding the orthodontic treatment, the technique we used was CSW by Dr. Pablo Echarri (Custom-made Straight Wire Technique).

A protocol adapted to orthodontic treatment corresponding to the case and patient was used, divided into 2 stages: pre-surgical and post-surgical.

The objective of the presurgical stage was to independently align and level the teeth of both jaws, decompensating both maxilla and mandible from each other, and seeking to establish canine class I, canine symmetry and incisor stability.

In the postsurgical stage, the case was completed with occlusal adjustments necessary for intercuspation and the stability of the bone segments in their new position.

Between both stages, the surgical procedure was performed, by means of bimaxillary orthognathic surgery with the technique of “vertical middle mandibular segmentation SRL (Roberto Lenarduzzi)”; that allowed the solution of the skeletal discrepancy, favoring the final results of treatment.

An unconventional technique was used, devised by the surgeon in charge of the case, which consists of performing a double osteotomy with a piezoelectric scalpel in the mental symphisis, at the level of the midline to the basal portion of the chin. This technique allows segmentation in the lower jaw, performing ostectomy with the removal of a bone fragment that allows the compensation of the positive discrepancy, and the surgical closure of the diastema.

INTRODUCTION

Developmental disorders include underdevelopment or overdevelopment of the facial skeleton. The alteration in the skeletal growth pattern or its speed conditions the existence of skeletal discrepancy which gradually becomes more and more accentuated and / or aggravated as the craniofacial mass develops, often resulting in a one normally developed portion and the other with a deficit or excess of growth. As a consequence of a skeletal alteration, variable alterations in occlusion occur.

The term “dentofacial deformity” is defined as a significant deviation from normal proportions of the maxillomandibular complex that negatively affects the relationship of the teeth with their jaw and that of each jaw with its antagonist. Said patients will present problems in their facial and dental harmony, with negative consequences for their functionality and their aesthetics (in some of them or in both at the same time). Today it is important to understand that modern society pays too much attention to physical appearance. Facial disharmony is related to a lack of self-esteem in a large number of patients, affecting their quality of life. In a global context, both anatomical and psychic factors are important in the search for an alternative to a treatment, working in an interdisciplinary way in the different areas of health care to achieve better clinical results.

The physical health of patients with severe malocclusion is compromised by alterations in mastication, speech disorders, decreased permeability of the upper airways, and various dysfunctions of the temporomandibular joint.

Treatment with corrective orthognathic surgery is indicated in cases of severe dento-maxillo-facial deformities that cannot be treated with orthodontics alone.

It is important to take into account that in clinical practice, dentofacial dimorphism presents innumerable situations in which the multidisciplinary orthodontic-surgical diagnosis offers different therapeutic variables. Therefore, fluid communication between all the professionals who interact in the patient’s treatment plan is essential. In addition, it is interesting to keep in mind that there are specific cases where orthodontic compensations have limitations, in spite of the great efforts of the professional, as well as in relation to the biological responses of the patient to the different therapies. This is where anatomical limitations occur, leading to resorption of labial alveolar bone, root resorption or discrepancies that exceed the solving capacity through orthodontics or dental aesthetics. Orthognathic surgery arises as an alternative treatment, fulfilling a fundamental role in the positioning of the bone bases that house the alveolar processes.

In the clinical case described in continuation, the solution to the positive dentoalveolar discrepancy was obtained surgically by means of mandibular medial segmental surgery (SRL Technique - Roberto Lenarduzzi).

INTRODUCTION TO THE CASE REPORT

A 35-year-old female patient, with facial and skeletal disharmony evaluated by the orthodontic and surgical team, through the pertinent studies.

The chief complaint was mainly the lack of facial aesthetics with mandibular left lateral deviation and multiple interdental spaces, as well as difficulty in mastication and joint pain.

The clinical examination was carried out with a study of preliminary models obtained from the patient and a photographic protocol that includes intraoral (in occlusion, frontal and lateral) and extraoral photographs (frontal, both profiles, at 45º, at rest and while smiling, as well as in forced smile). It was observed that the patient presented (Figs. 1-6):

Figs. 1-6. Pre-surgical photographs.

- Class III malocclusion.
- Severe facial asymmetry with aesthetic issues.
- Deviation of the facial midline to the left.
- Maxillary retrognathia.
- Mandibular prognathia.
- Concave profile, marked nasolabial sulcus, reduced lower facial third.
- Inclination of the pupillary and commissural line.
- Superior retrochelia and inferior prochelia.
- Inclination of the occlusal plane in respect to the pupillary plane.
- Overjet and overbite alteration.
- Thickened upper frenula.

At the dental level, the patient presents:

- Antero-superior diastema in the teeth 11 and 21.
- Antero-inferior spaces in the teeth 34, 33, 32, 31, 41, 42, 43.
- Upper and lower dental midlines do not match.
- Left unilateral posterior cross bite, with transverse compression of the maxilla.
- Postural comfort position.

In the functional analysis it was observed:

- Dysfunctional deglutition.
- Lip incompetence.
- Limitation of mandibular movements.
- Joint noises.

Complementary diagnostic studies were requested (panoramic X-ray, frontal and lateral X-ray, cone beam tomography of both jaws and temporomandibular joint) and corresponding cephalometric studies.

A digital scan of both jaws was performed using CADCAM technology and digital records were taken using an articulator to carry out three-dimensional virtual planning with the Dolphin Imaging software. Using the DICOM images and STL files, a 3D analysis of the craniofacial anatomy and the surgical simulation of the planned segmentations were possible.

Based on what was studied and planned, it was decided to carry out:

- Presurgical and post-surgical orthodontic treatment, using Dr. Pablo Echarri's CSW technique.
- Surgical treatment: anterior segmented Lefort I surgery in the maxilla and mandibular bilateral sagittal osteotomy with middle segmental osteotomy in the symphisis.

Kinetic rehabilitation for soft tissues, postural and respiratory work, deglutition phonation reeducation, and psychological support during the process were indicated.

ORTHODONTIC-SURGICAL PROTOCOL

In the pre-surgical orthodontic stage, we sought to meet the objectives already outlined in the abstract of this article: alignment, leveling and correction of rotations (ANR) together with decompensation and symmetry of jaws.

Modified Straight Wire technique: Arch wire sequence:

- .016" NiTi arch wire
- .016"x.016" NiTi arch wire
- .016"x.022" NiTi arch wire
- .016"x.022" SS arch wire
- Hooks insertion

Regarding the surgical protocol, bimaxillary orthognathic surgery was performed, under general anesthesia with nasotracheal intubation, using preformed tubes. Sterilization, antisepsis and preparation of surgical fields were carried out. With a McWesson mouth gag placed on the opposite side, the insertion of the Wieder tongue depressor-separator and a Minnesota separator supported on the external oblique ridge, the first incision was carried out. The first incision is made directly over the external oblique ridge approximately at the level of the occlusion, and then it is extended inferiorly and laterally to the teeth, leaving the gingival margin intact 5-6 mm. A mucoperiosteal flap was carried out, exposing the external oblique ridge, placing a modified Farabeuf retractor (RL) by the surgeon up to the lingual fossa, where the retractor was placed to protect the nerve plexus. The periosteum was separated from the mandibular ramus, placing an Obwegeser ramus retractor, and then held with a curved Satinsky clamp. With a exploration instrument, the emergence of the inferior alveolar plexus is located, with endoscopic support, at the level of the Spix spine, in order to repair it, protect it and avoid it when performing the osteotomy in the internal part of the ramus. With piezosurgery, the osteotomy is performed on this surface, and then it is continued diagonally in the internal angular rim of the anterior border of the ramus, descending to the trigone area and passing towards the vestibular area. The silhouette of the sagittal ramus osteotomy (Obwegeser-Dalpont) is marked on the cortical bone, using a reciprocating saw. The bone is cut following the external oblique ridge of the mandibular corpus. The

cut was made with a 45º bevel and completely up to the lower mandibular edge. This is a very important detail, since the incomplete osteotomy at the lower edge enables complications when the surgical fracture is carried out. It is also important to highlight that when carrying out the vertical osteotomy of mandibular corpus, we must previously remove the Satinsky clamp to allow better maneuverability of the mandible and achieve better handling when reaching the basal edge of the mandible. The same technique was performed on the opposite side of the jaw. Gauze dressings were placed on the wounds in order to continue working on the upper jaw (Fig. 7).

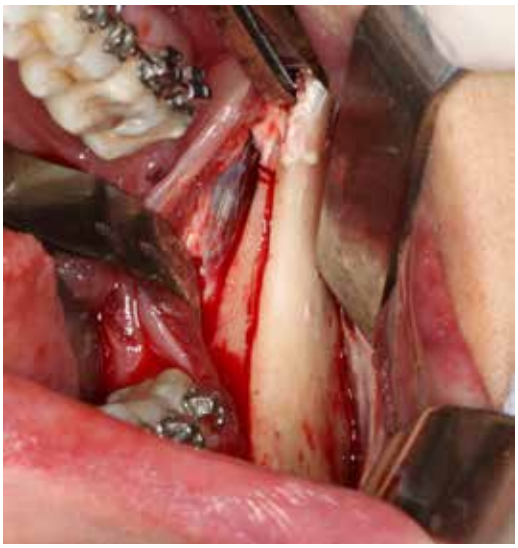


Fig. 7: Sagittal osteotomy of the mandibular ramus. Holding of the mandibular ramus with Satinsky clamps. Internal osteotomy with piezosurgery. Diagonal osteotomy of anterior margin, which will then be complemented with a micro saw.

The procedure was carried out in the upper jaw, placing the labial separator retractor. The previous reference measurement was carried out with a caliper, from the inner canthus of the eye to the mesial of the canine and first molars, in order to later know how much the maxilla was impacted and / or advanced, according to the planning.

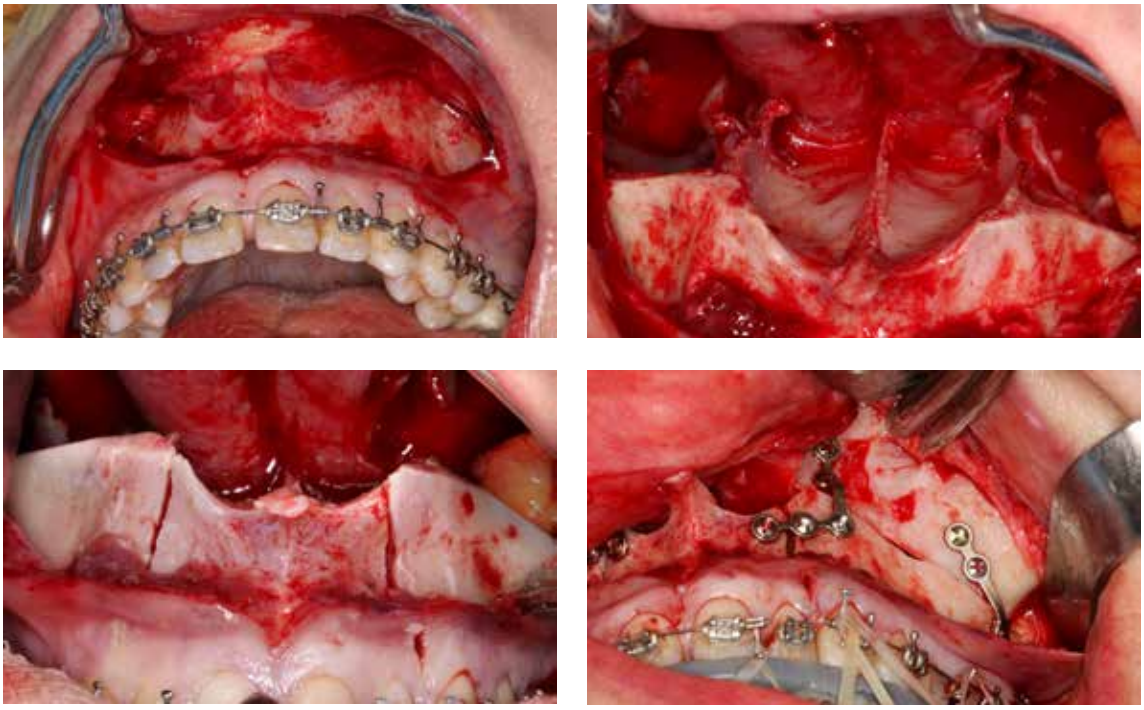
A horizontal incision was made with a fine-tipped monopolar electrosurgical unit, incising from canine to canine to perform separation by tunneling towards the molar area, up to the pterygomaxillary junction. The anterior nasal spine, the lower border of the pyriform aperture, the infraorbital foramen, the lateral maxillary wall, and the zygomatic-maxillary junction were exposed.

Dissection of the septal mucosa into the posterior palatine bone and the vomer bone was carried out after the completion of bilateral maxillary osteotomy.

The lateral osteotomy was performed in the antero-external wall of the sinus and in the postero-external wall of the sinus by tunneling to the distal of the tuberosity. Then the osteotomy of the nasal septum, including the vomer bone, is carried out. The osteotomy is continued through the intersinus nasal wall to the most distal part. All osteotomies are performed with piezosurgery and, if completed with a micro-saw, the structures should always be protected with horizontally placed separators. This osteotomy is performed bilaterally and then the “Down fracture” is carried out with the thin curved Obwegeser osteotome, from front to back, until the maxilla is detached from the anterior parts of the pterygoid processes.

Then, the anterior segmentation of the maxilla was continued using a piezoelectric scalpel. The vertical osteotomies were delimited between the roots of the lateral incisors and the canines. This osteotomy was continued up to the midline 5-7 mm behind the anterior nasal spine, on both sides of the septum up to the limit of the hard palate, leaving 4 segments. We must emphasize that it is of outmost importance that the palatal mucosa and the nasal mucosa remain intact to prevent possible oronasal fistulas (frequent complication when any of the mucosa is damaged). We used endoscopic support to separate the nasal mucosa using the Hadad-Lenarduzzi technique. After the completion of the osteotomies, the surgical splint was placed and the occlusion adjusted according to plan. Temporary elastic intermaxillary fixation was made and planned impaction was

verified by taking caliper measurements in the aforementioned references. The maxilla is fixed with titanium plates, using two L-shaped canine plates and two more posterior 1.6 mm linear plates and 4 mm screws. Subsequently, the mucosal



Figs. 8-11. Upper jaw surgery.

incisions are closed with a Vycril 3/0 absorbable suture and a 21 mm needle. The alar girth was closed by taking the lesser alar cartilage and the closure by planes was carried out (Figs. 8-11).

In the mandible, segmentation was planned to compensate the positive discrepancy by the excess bone ostectomy. There is no technique in the literature that describes it exactly, so its originality allows us to give name it after us, although there are other types of jaw osteotomy such as the Obwegeser and Obwegeser-Dalpont sagittal ramus osteotomy; vertical ramus osteotomy (Letterman), oblique ramus osteotomy (Hinds); subapical osteotomy, etc. In the analog physical models, an incompatibility was seen between the upper and lower jaws, difficult to correct with dental reconstructions or fixed prostheses such as crowns or veneers due to the big size of the spaces. Therefore, analog and virtual models were used for treatment planning through segmentations with orthognathic surgery. The teeth were moved from the midline towards the canines, which was the reference point used. Thus the orthodontist moved teeth 31 and 32 to the left, and teeth 41 and 42 to the right, creating in this way a single diastema in the midline (a necessary requirement for medial osteotomy). Once the objective was achieved, new digital models were taken, which were incorporated into the 3D surgical planning program through STL files, for their evaluation and diagnosis. Before this, a simulation of the osteotomy is performed with the 3D Meshmixer treatment program, generating the already osteomized model to insert it into the Dolphin.

Once the planning is done, the patient goes to the operating room with the intermediate and final surgical splints.

Mandibular surgery was carried out through ostectomy along the entire mandibular ramus. Once completed, the expansion is carried out, allowing the separation of both distal and proximal segments, and the location of the inferior alveolar nerve against the distal segment is verified.

In continuation, in the chin zone the technique devised by Dr. Roberto C. Lenarduzzi was carried out, which consists of a double osteotomy which enables to the separation of the right and left segments. To carry it out, the number of millimeters necessary for skeletal compensation of the dentoalveolar discrepancy without orthodontic solution was calculated, and it was carried out with the “SRL segmental technique”. We proceeded by performing a Newman flap at the mesial level of both canines. At the level of the midline, the double osteotomy was first marked with a distance equal to the fragment to be removed with piezosurgery, reaching the basal portion of the chin. The orthodontic archwire was cut in the midline. The bone fragment was removed and the mandible was moved to the planned position using the surgical splint as a guide and fixing

Fig. 12. Osteotomía.

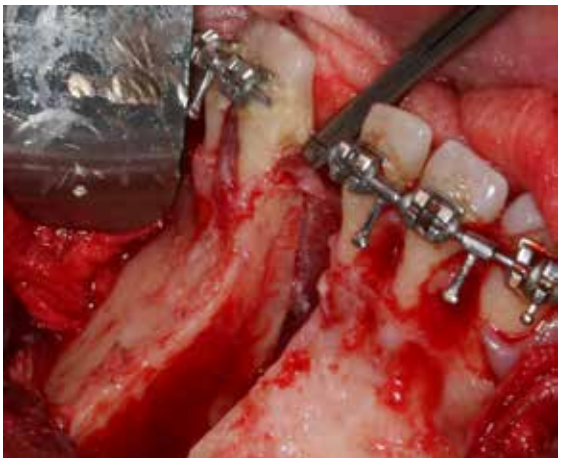


Fig. 13aand b. Second osteotomy and ostectomy.

the segments with intermaxillary elastics (Figs. 12 and 13).

Before rigid fixation, the posterior proximal segments in the glenoid fossa and the alignment of the lower edge of the proximal segment with the distal segment were checked.

In the mandible, the chin was first fixed with 2 rigid linear 2.0 mm plates with their respective screws and later the posterior sector was also fixed with two 2.0 mm bridged plates, one on each side. The planned occlusion was checked and both wounds were sutured with Vycril 3/0 resorbable thread using simple stitches. Before completing the rigid fixation, it is important to place the 2 screws in the proximal segment and only one screw in the distal segment. Subsequently, the intermaxillary elastic fixation is removed to verify the passivity of the position of the two segments. After this check, the lat 2 screws are fitted. If at this time a lack of passivity is found, only the screw of the proximal segment on each side is loosened, repositioned and refitted, avoiding in this way to have to remove all the screws (Fig. 14).

Fig. 14. Fixation with 2.0 plates.

Finally, the occlusion and position of the temporomandibular joints are checked so the oral cavity can be washed for elimination of clots which helps to control the postoperative bleeding.

Once the surgery is finished, the pack is removed, and after verifying the absence of bleeding, the anesthesiologist carries out the extubation of the patient. We waited for a patient to wake up and to give her the pertinent indications for nursing, since the patient is transferred to intermediate care for a couple of hours. Then the patient continues to be admitted until the next day and receives intravenous antibiotics, NSAID-type analgesics, opioid derivative, gastric protector, and regulated dexamethasone. Outpatient medication will continue. After 36 hours the patient was discharged from the hospital. In these cases, all the indications for care are given and a strict diet is indicated going from liquid to soft and semi-solid foods progressively, until starting with a solid diet from the day 16.

It is also important to highlight that from the day 2 the mouth opening and closing exercises begin. Elastics are placed on the day 4 for functional muscular reeducation and as a guide to the new position. Also, on 3rd or 4th day, kinesiotherapy is started to reestablish correct lymphatic drainage which facilitates the process of de-inflammation (Fig. 15).

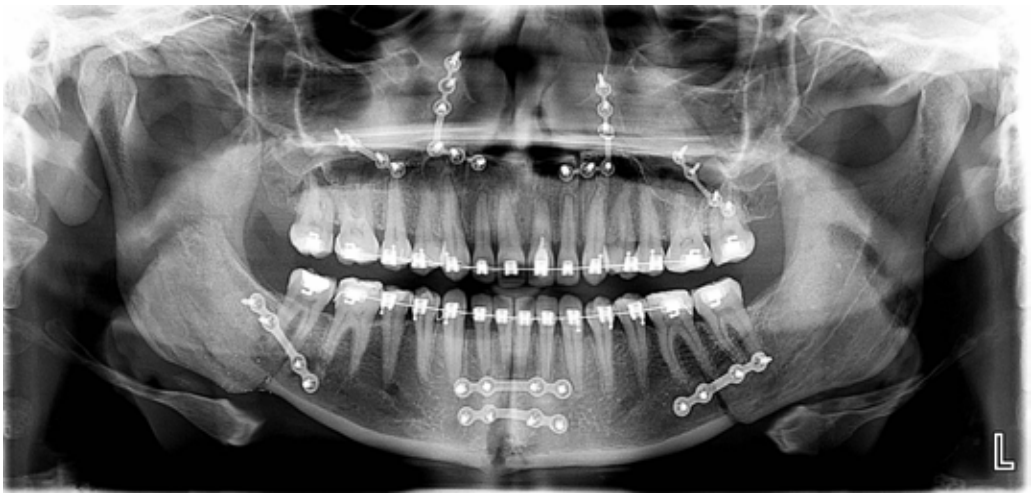


Fig. 15. Post-surgical panoramic X-ray.

FINAL POST SURGICAL ORTHODONTIC STAGE

- Replacement of cut arch wires to provide support and stability to the bone-dental segments.
- Immediate use of light elastics to reinforce the interdigitation of the occlusion and fix the established maxillary relationship.
- Myofunctional rehabilitation.

The following sequence of arcs continued:

- Rigid rectangular .017 ”X .022” SS arch wire.
- Rigid rectangular .018 ”X .025” SS arch wire.

The arch wires were kept in the healing stage (approximately 6 months).

The total treatment time was 18 months.

In the final retention stage, a fixed canine-to-canine retainer was used in the mandible and a removable retainer in the maxilla (Hawley plate). Lifetime use of retention appliances was indicated (Figs. 16 and 17).

Figs. 16a-f and 17ad. Intra and extraoral comparison before and after.

CONCLUSION

It is important to highlight the multidisciplinary teamwork of the professionals of orthodontics and surgery specialties, since otherwise the obtained result could not have been reached. It is also necessary to understand the different alternatives presented by each case in particular, having a broad and open insight in the diagnosis and treatment, like in this case where the cooperation between surgeon and orthodontist allowed solving the mandibular dentoskeletal discrepancy, with the middle sagittal osteotomy of mandible using SRL technique. Sometimes, the alternatives can offer us treatment possibilities different from those practiced up to the moment, so the interrelation of various specialties provides atypical solutions. In this way, it was sought to avoid possible root and alveolar bone resorption, mainly in the labial area due to the application of orthodontic

forces and thus preserve a good periodontal condition of the teeth in order to achieve better results in post-surgical treatment. From the aesthetic point of view, the preservation of teeth without restorations will always have a better prognosis, in spite of the existence of excellent restorative possibilities we have today. It should be highlighted that this technique also gives the jaw a more refined anatomy in its frontal view and that in certain patients it also greatly improves aesthetics, as happened with this patient.

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To provide the students with the theory-hands-on bases necessary to be able to carry out the malocclusion treatments with sequential transparent aligners, to carry out the diagnosis and the treatment plan, to be familiar with the used appliances, to be familiar with the protocols of insertion, adapting and activation of aligners in all stages of the treatment.

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Treatment of class II malocclusion with extractions and microimplants

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INTRODUCTION

The aesthetic aspects that affect the smile motivate adult patients to seek orthodontic treatment. Furthermore, the ability to carry out the correction with discreet brackets is currently not only an option but also a requirement.

It should also be highlighted that since we do not have the growth factor in favor of orthodontic mechanics, dental extractions are often necessary to achive a successful correction of dicrepancies. In this context, microimplants represent effective resources to control anchorage and make important changes such as correcting the occlusal plane inclination and the deep bite.

The purpose of this clinical case is to present the compensatory treatment option for Class II Division 1 malocclusion with extractions of upper first bicuspids, and skeletal anchorage-based mechanics..

CASE REPORT

ANC, a 36-year-old patient, who sought orthodontic treatment due to the discomfort provoked by the overjet, giving the impression that “the teeth were forward”. In addition, he also complained of buccal corridors that compromised the aesthetics of a smile and he also required the use of esthetic brackets.

The issues that required orthodontic correction were: bilateral Class II division 1 malocclusion, excessive labialization of upper and lower incisors, occlusal plane inclination, marked deep bite, and the shape of the upper and lower jaws.

Extractions of the upper first bicuspids were indicated for the correction of the accentuated overjet, as well as for the inclination of the occlusal plane and improvement of the curve of Spee. As anchorage, the use of microimplants inserted as high as possible (within the limits of the keratinized gingiva) was indicated, so that during retraction there was also a vertical force vector, which would favor the correction of the deep bite and harmonization the occlusal plane. In addition, coordinated SS arch wires were used in order to obtain a smooth dentoalveolar expansion, contributing to the elimination of buccal corridors.

Fig. 1. Initial extraoral photographs.

Fig. 2. Initial intraoral photographs.

Fig. 3. Initial occlusal photographs.

Fig. 4. Initial lateral X-rays.

Fig. 5. Initial panoramic x-ray.

Biomechanics was developed through the following steps:

- Alignment and leveling with controlled dentoalveolar expansion, through the coordination of the upper and lower jaws.
- Lower interproximal trimming (33-43).
- Extractions of the upper first bicuspids.
- Anchorage based on microimplants inserted as high as possible within the keratinized gingival area.
- Class II mechanics.
- SS arch wires with accentuated upper curve and pronounced lower reverse curve.
- Use of Class II elastics and intercuspation.

The sequence of orthodontic arch wires used was: .014” NiTi; .016” NiTi; .018” SS, .020” SS, .017x.025” NiTi; .018”x.025” SS

Fig. 6. Intermediate extraoral photographs.

Fig. 7. Intermediate intraoral photographs.

Fig. 8. Intermediate occlusal photographs.

Fig. 9.Final extraoral photographs.

Fig. 10. Final frontal and lateral intraoral photographs.

Fig. 11. Final occlusal photographs.

Fig. 12. Final lateral X-rays

Fig. 13. Final panoramic x-ray.

Fig. 14.Comparison in initial and final frontal-lateral view.

Fig. 15. Comparison of initial and final occlusal view.

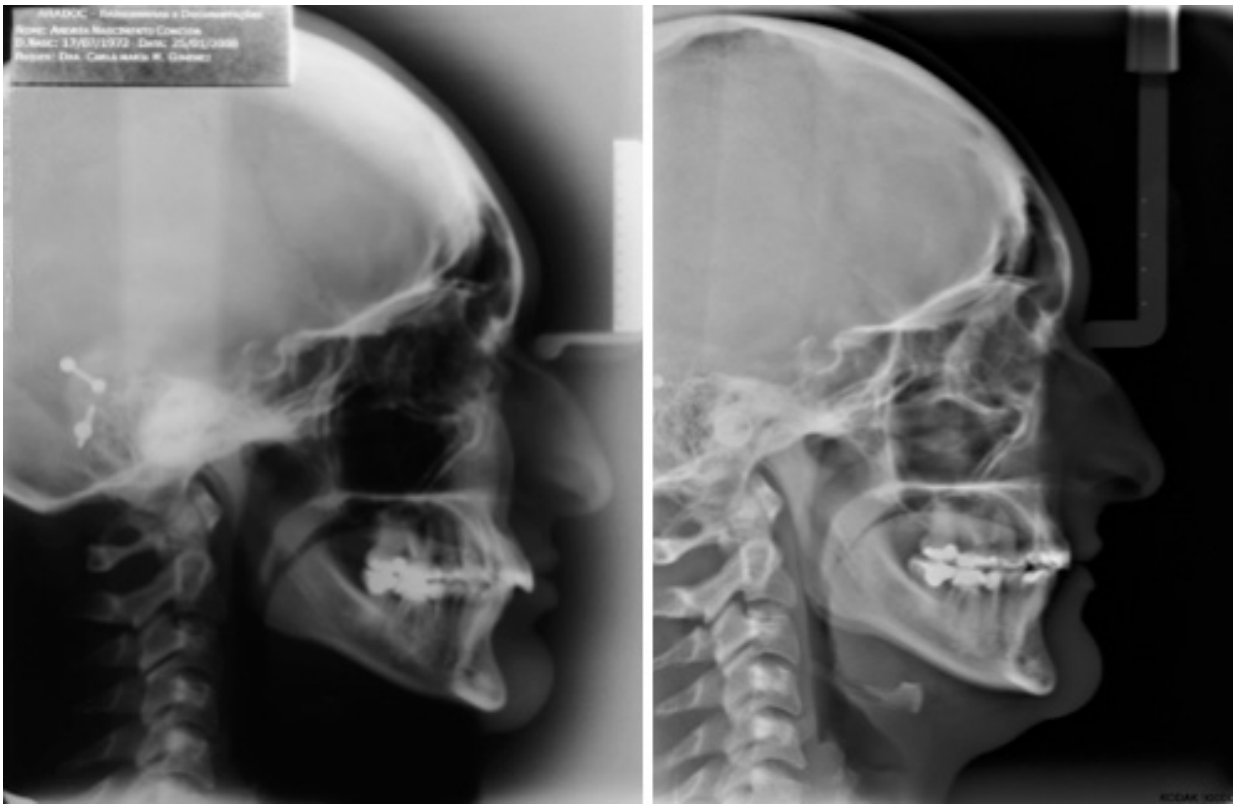

Fig. 16. Comparison of the initial and final X-rays.

RESULTS

The results obtained in 18 months of treatment were satisfactory; they contributed to the esthetics of the smile and the face, and provided conditions for functional occlusion. It was possible to achieve the satisfactory correction of Class II and increased overjet, an adequate torque control, the shape of the jaw improved significantly, the intercanine distance was respected, the inclination of the occlusal plane and the deep bite were adequately corrected. The buccal corridors were eliminated which favored the projection of the smile. It is also important to highlight that periodontal condition was improved.

CONCLUSIONS

Class II compensatory treatment with extractions of upper first bicuspids and microimplant-based anchorage proved to be efficient with advantages related to treatment time, torque control, positioning of the incisors in bony bases, harmonization of the occlusal plane , the overbite correction and the possibility of a controlled expansion thanks to the application of light forces with the jaws coordination.

3RD EDITION OF THE BOOK

ORTHODONTICS & MICROIMPLANTS

SARDAC TECHNIQUE

COMPLETE STEP-BY-STEP TECHNIQUE

AUTHORS: PABLO ECHARRI Y LORENZO FAVERO
COLLABORATORS: ENRIQUE GONZÁLEZ, MIGUEL ÁNGEL PÉREZ CAMPOY AND JAVIER ECHARRI

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Treatment of Class I malocclusion with crowding and left lateral open bite

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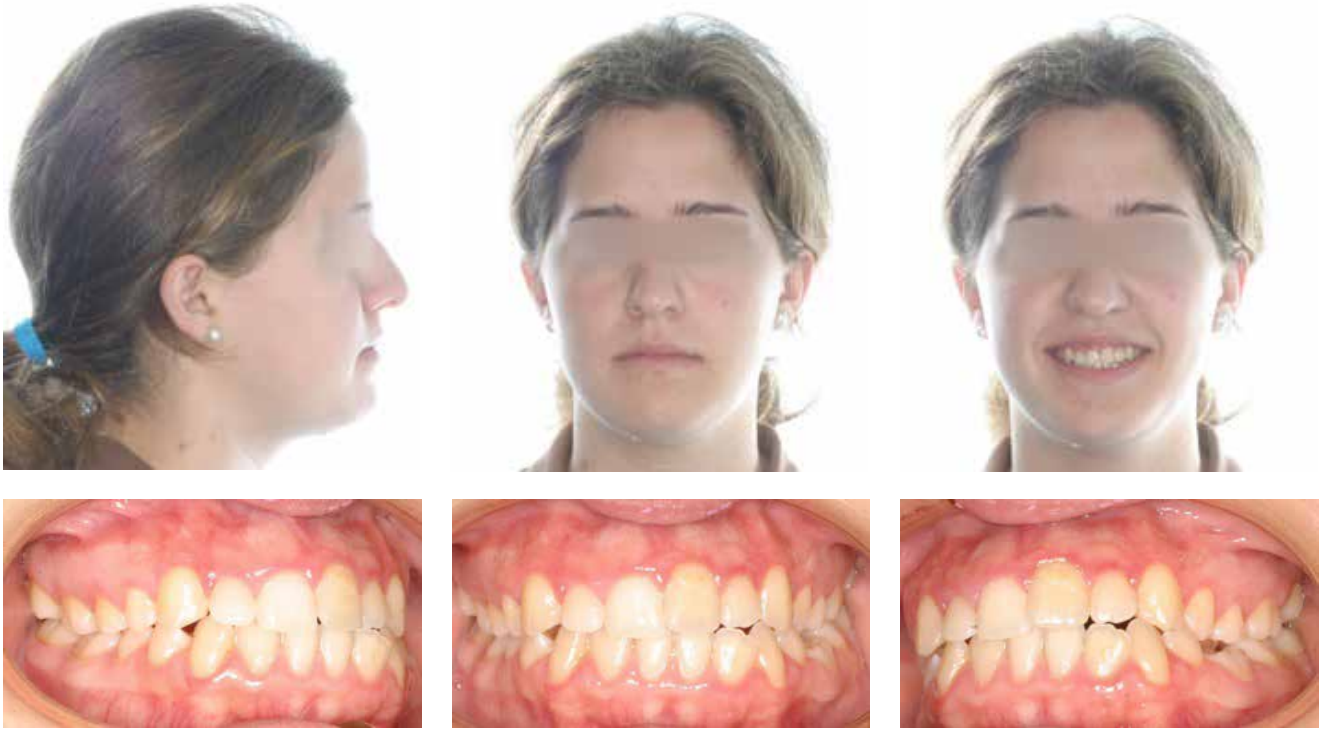
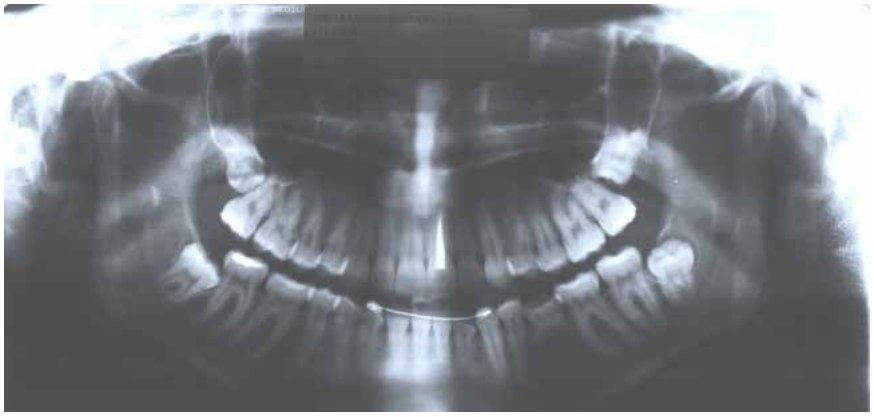
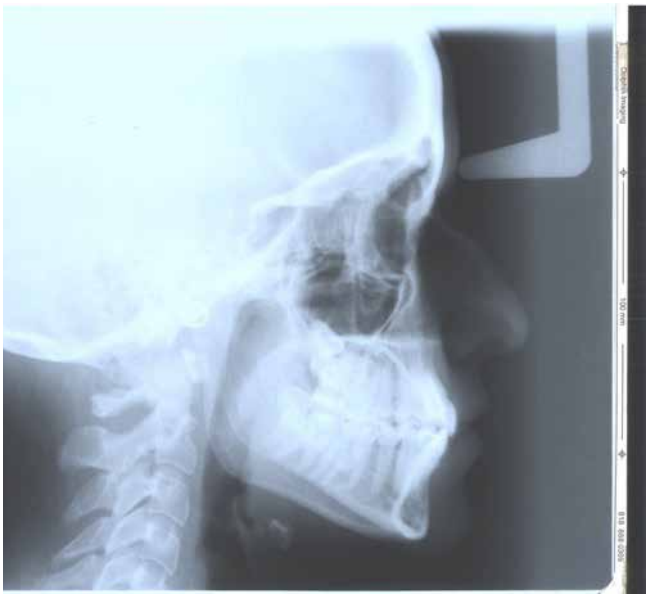
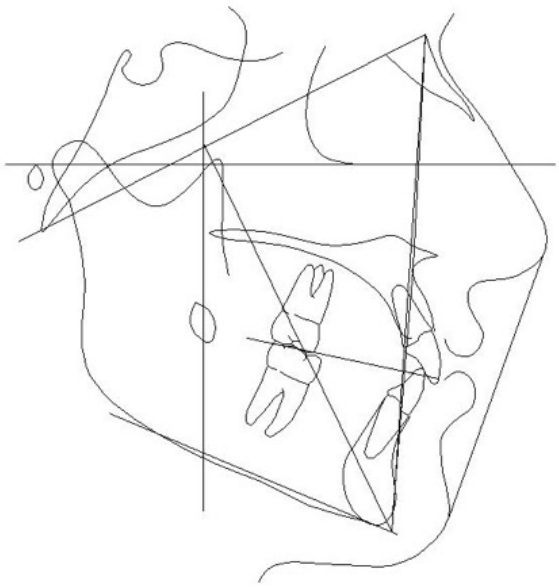
A 17-year-old female patient presents a molar Class I malocclusion with crowding in both jaws and a left lateral open bite. The patient reported pain in both TMJs and in the right and left anterior temporal and masseter muscles, compatible with craniomandibular dysfunction. She presents germs of all four third molars in retained position, and agenesis of 35 with ankylosis of 75. There are also differences in the leveling of the upper margins, especially since 21 (darkened by endodontic treatment) is longer than 11. The initial records can be seen in figure 1.



Figs. 1a-f.

Figs. 1g-k.

Treatment is started with a lower relaxation splint with maximum contacts in centric relation and with anterior and canine guide (Figure 2).

Figs. 2a, b and c.

Once the muscle and joint pain is controlled, after 4 months of treatment and maintaining the lower splint, the treatment is started in the maxilla with Roth .018 ”esthetic brackets and a .016” heat treated NiTi arch wire. The 75 was also extracted (figure 3).

Figs. 3a-d.

In figure 4 the progress of the treatment is observed and in figure 5 the .016” x .022” heat treated NiTi arch wire is ligated. A patient stops using the lower splint, and the bonding in the mandible is carried out by ligating a .016” heat treated NiTi arch wire (figure 6).

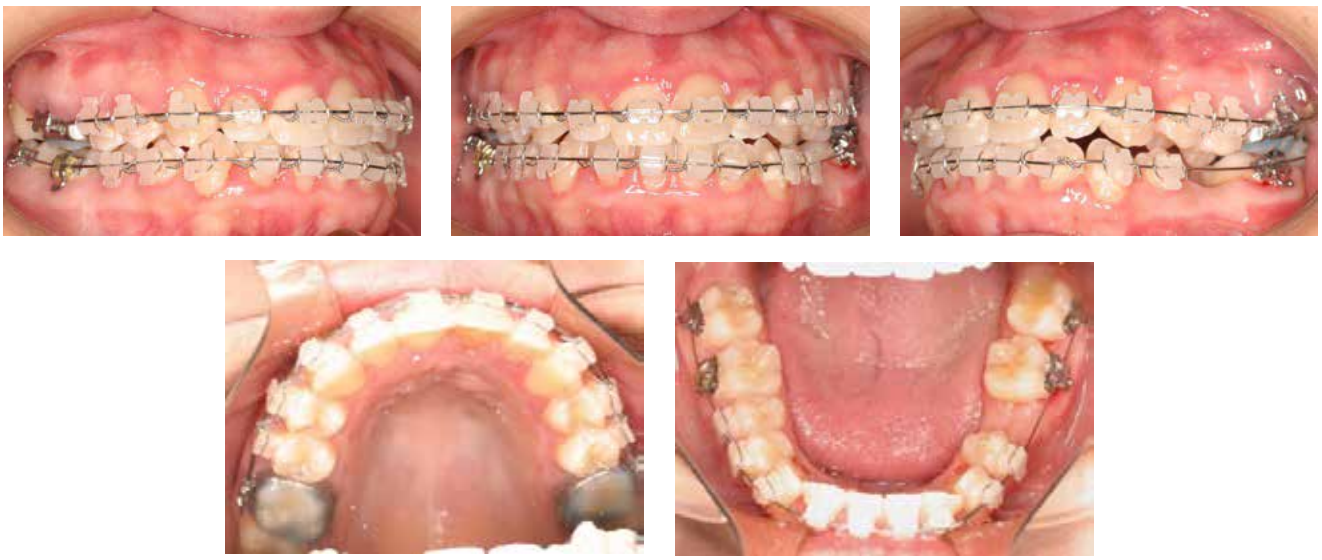
Figs. 4a-d.

Figs. 4a, b and c.

Fig. 5d.

Figs. 6a-e.

In figure 7 the lower .016"x .022" heat treated NiTi arch wire is ligated and upper and lower .016 "x .022" SS arch wires are ligated with the figure 8 ligature.



Figs. 7a-e.

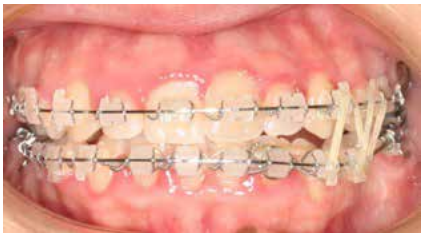
Figs. 7f-j.

Figs. 8a-e

Figure 9 shows the left lateral open bite and figure 10 shows the intermaxillary elastics indicated for the correction of this open bite (4.5 ounce 1/8 ”elastics).

Figs. 9a, b and c.

Figs. 9d and e.



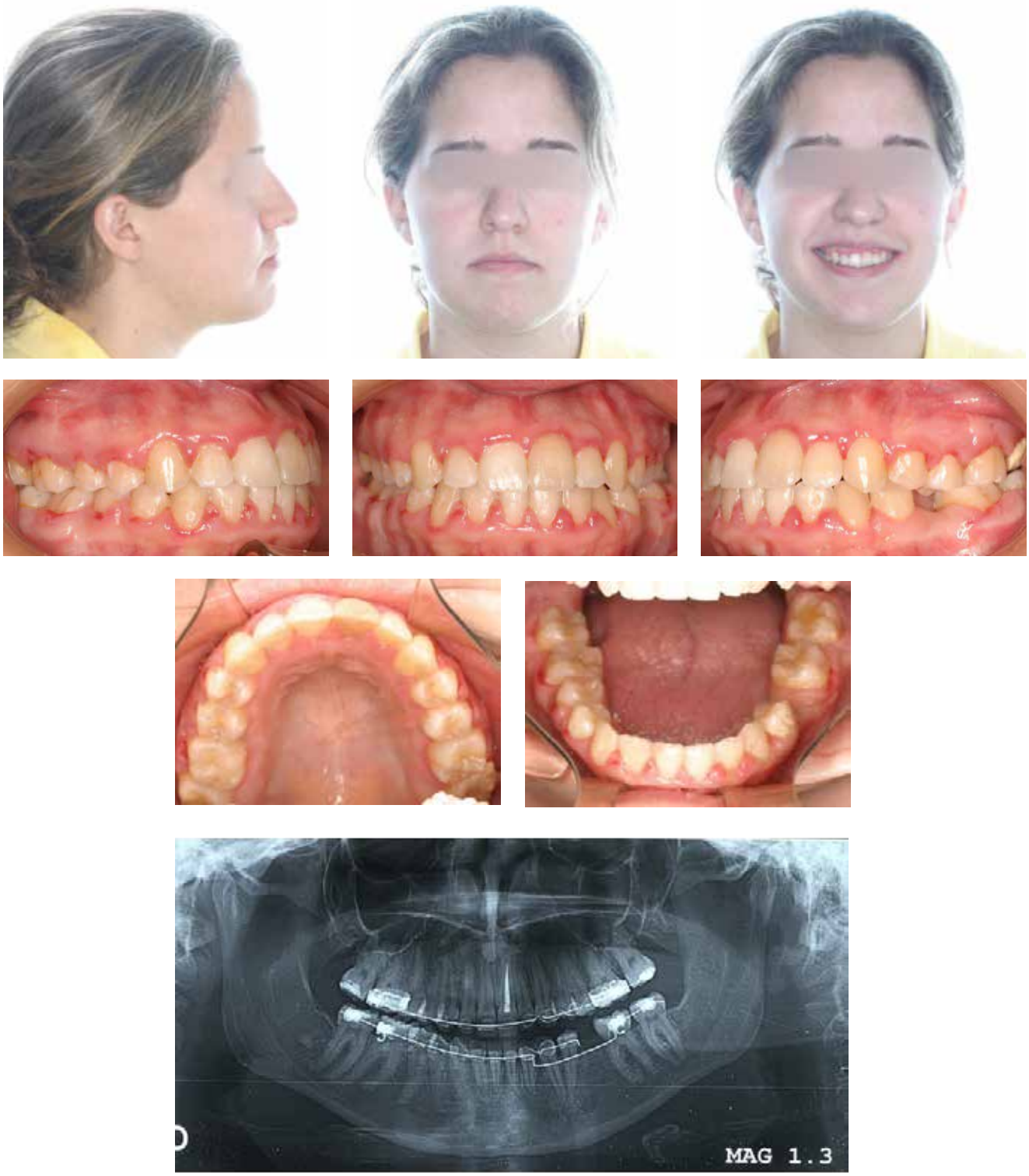
Figs. 10a-f.

Figure 11 shows the progress of the treatment and figure 12 shows the double arch wires used to reduce the lower anchorage and complete the correction of the lateral open bite. A .016 ”x .022” SS arch wire is ligated to the brackets from 46 to 32 and then a gingival step is carried out so the 36 tube can be reached. A sectional arch wire from 33 to 34 is used and a figure 8 ligature from 32 to 33 (Figure 12).

Figs. 11a-f.

Figs. 12a-e.

Figure 13 shows the final result of the treatment. An implant and a crown should be inserted instead of 35.



Figs. 13a-i.

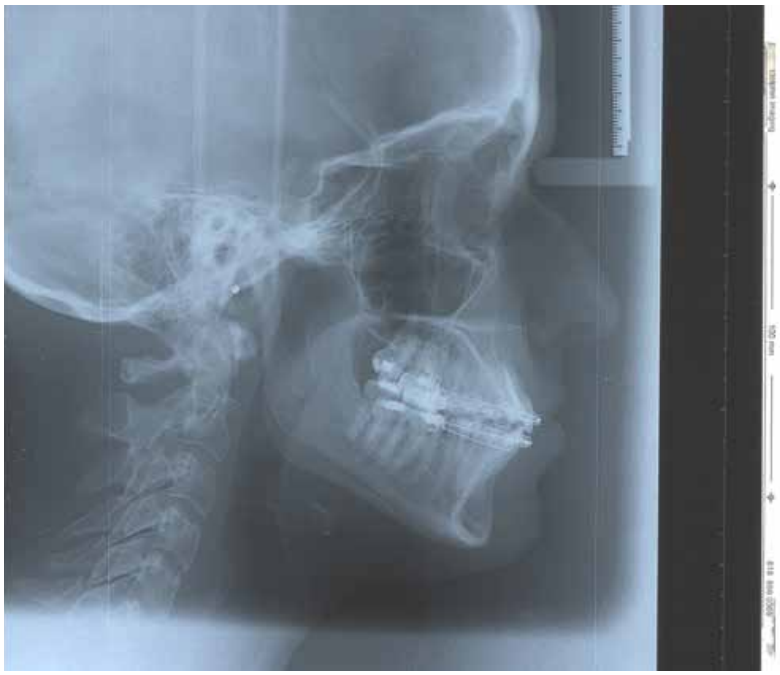


Fig. 13j.

Figure 14 shows the soft tissue retouching necessary to optimize the esthetics of the anterior group.

Fig. 14.

CUSTOM-MADE STRAIGHT WIRE CSW

1

DIAGNOSIS AND TREATMENT PLAN IN ORTHODONTICS

2nd edition, volume 1, CSW collection

AUTHOR: Pablo Echarri

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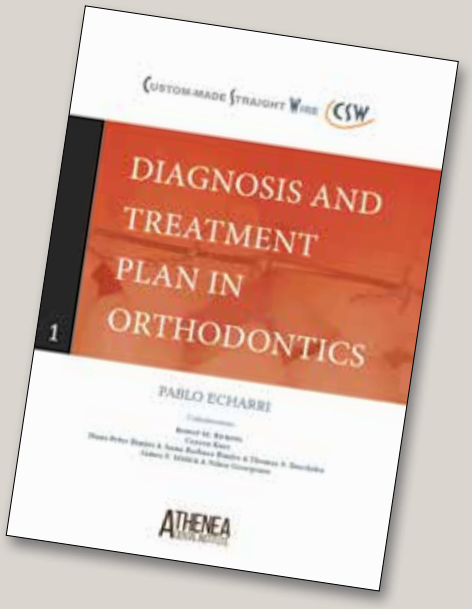

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Class III treatment with face mask and microimplants

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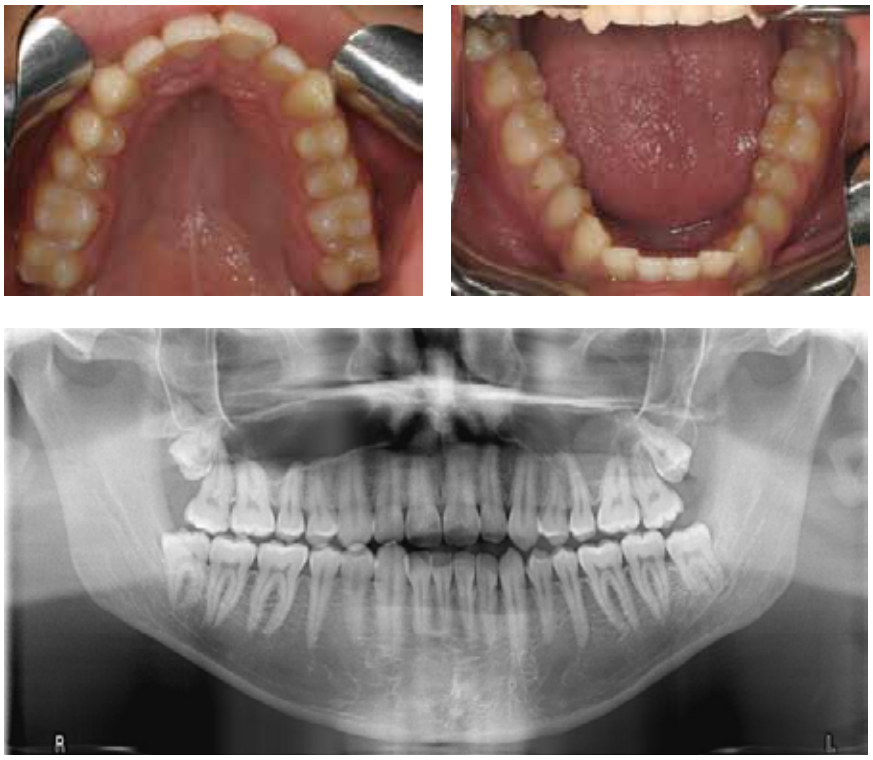
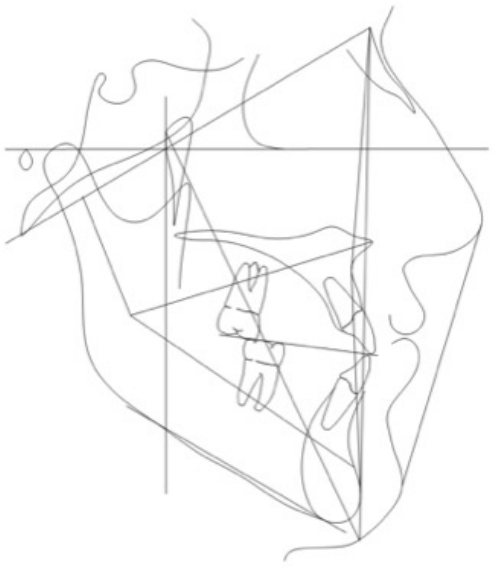
A 20-year-old male patient presents a molar Class III malocclusion with left posterior cross bite, anterior cross bite, vertical edge-to-edge bite, and deviation of the lower midline to the left. The panoramic x-ray shows the presence of the four third molars and from the cephalometric point of view, he presents a skeletal Class III with a dolichofacial pattern. The initial records can be seen in figure 1.

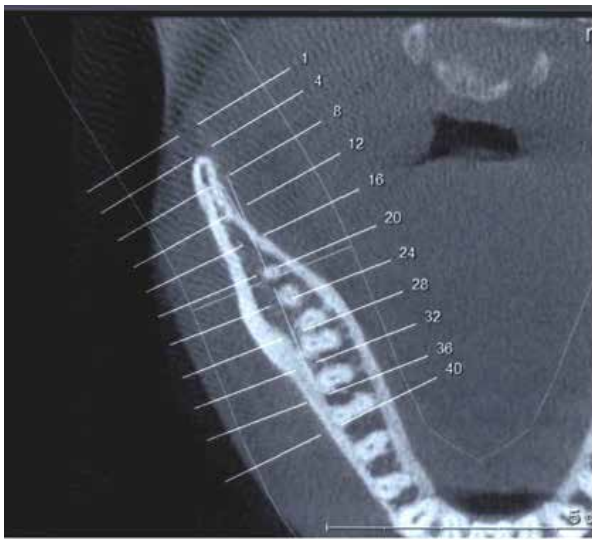
Figs. 1a-f.

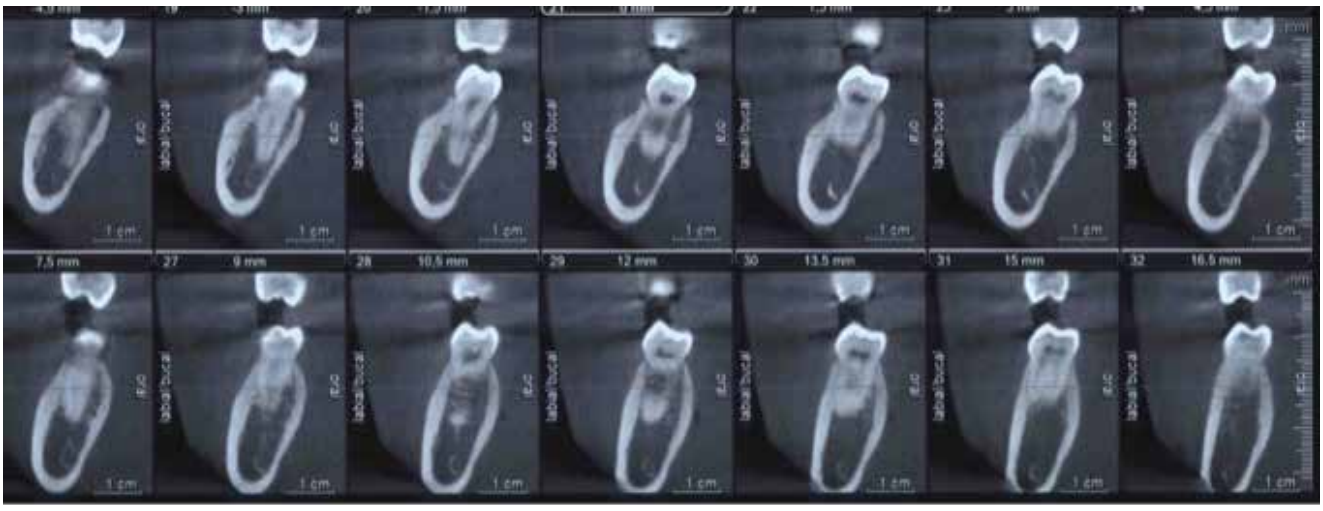




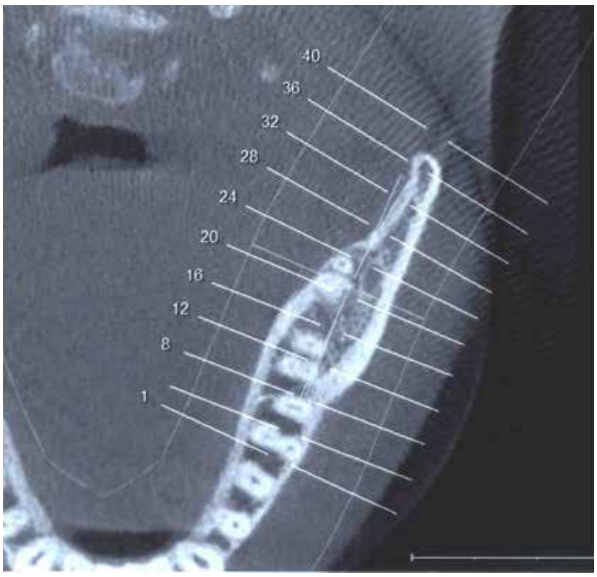
Figs. 1g-k.

Figure 2 shows the tomographic study of the patient and, in particular, we can observe that the lower third molars present a distal retention in the mandibular ramus and that the distalization of the lower teeth must be done in labial direction in order to respect the shape of the mandible. Treatment begins with a labial direct bonding separator with bands in the first molars, brackets in the bicuspids, and sectional arch wires for anterior traction with a face mask with 6.5 oz. 3/16 ”elastics. The anterior traction is performed in a forward and downward direction. Hyrax screw activation of ¼ every other day is carried out to achieve Rapid Palatal Expansion. The Alt-Ramec protocol is then continued to keep the sutures active during anterior traction (Figure 3).



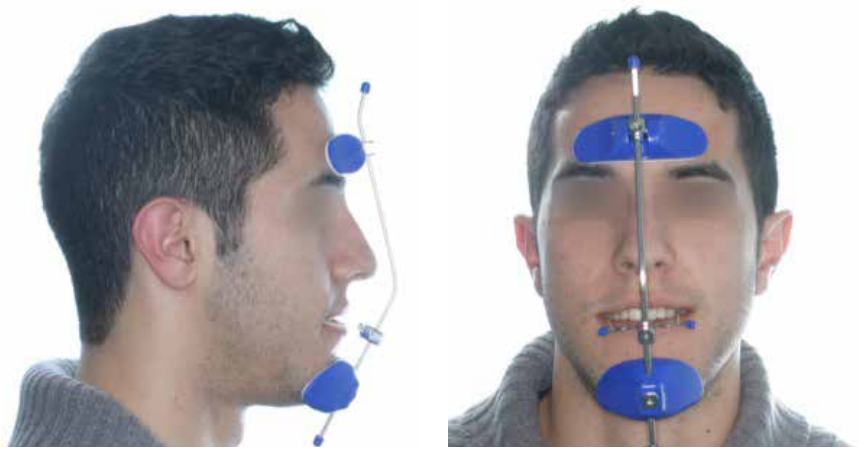


Figs.2a-d.



Figs.2e, f and g.

Figs. 3a, b and c.

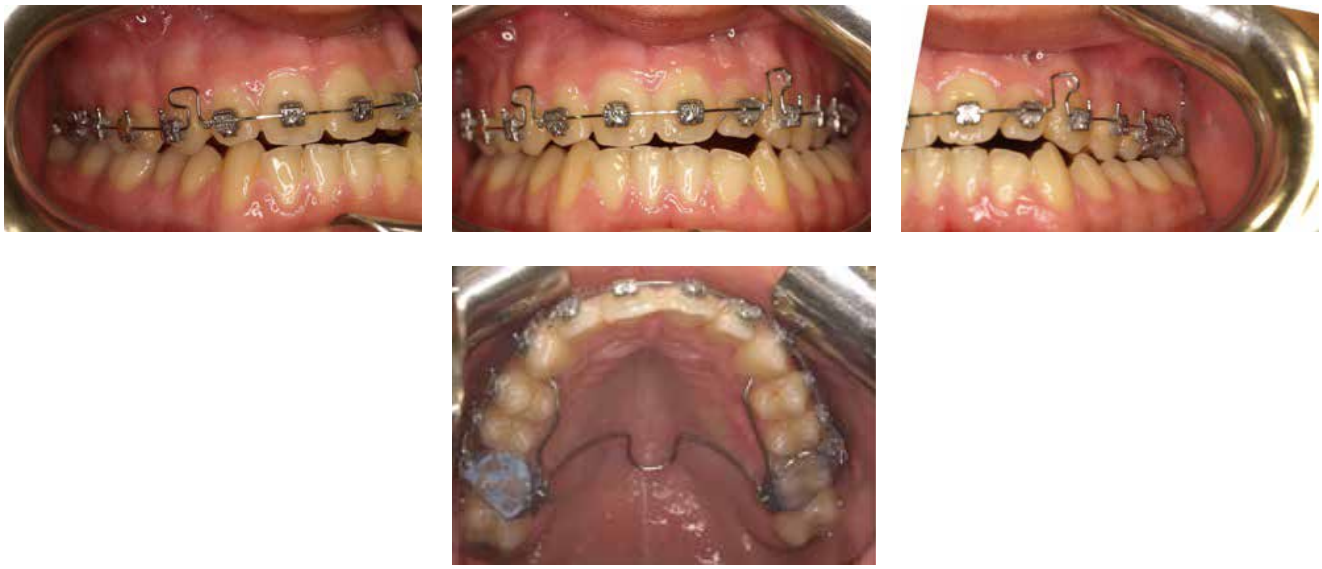


Figs. 3a, b and c.

Figure 4 shows the complete bonding in maxilla carried out with self-ligating brackets. .014 ”NiTi archwire is placed for superior alignment and leveling. The separation appliance is replaced by a transpalatal bar with anterior arms.

Figs. 4a-d.

We continue with a .014 ”x.025” NiTi arch wire and then a .017 ”x .025” SS arch wire, with antecanine L loops for anterior traction and ligated antemolar omegas (Figure 5).



Figs. 5a-d.

Figure 6 shows the bonding in mandible and the alignment with a .014” NiTi arch wire.

Figs. 6a-e.

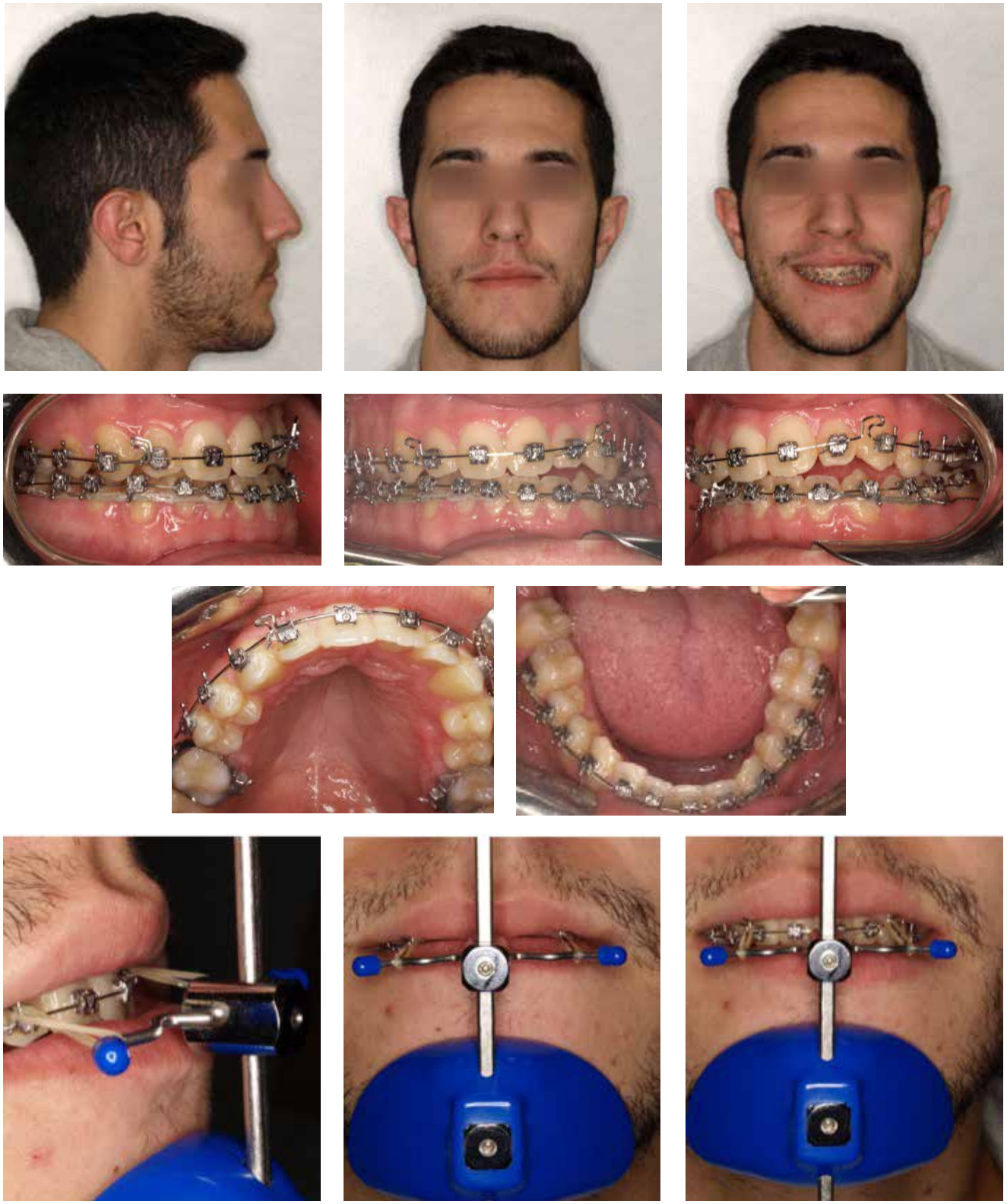
In figure 7 the torque is established with a .014"x .025" NiTi arch wire and in figure 8 a lower .017 "x .025" SS arch wire is inserted and the Class III intermaxillary elastics (3/16 "and 4.5 oz) are used. The anterior traction is continued from the T loops the upper arch wire to the face mask (Figure 9).

Figs. 7a-e.

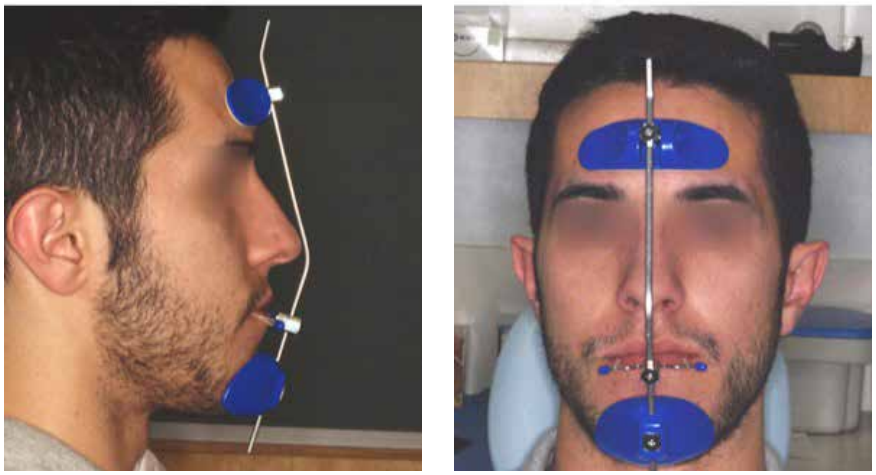
Figs. 8a and b.

Figs. 9a, b and c.

In Figure 10, the treatment is continued but a microimplant is also inserted in the labial surface of the mandibular retromolar trigone on the right side and the lower third molars are extracted. The distalization of the right side of the mandible to correct Class III and midline deviation is performed with an elastic chain from the canine to the microimplant, using a .017 ”x .025” SS arch wire.



Figs. 10a-k.



Figs. 10l and m.

Figure 11 shows the final result of the treatment.

Figs. 11a-f.

Fig. 11g.

CONCLUSIONS

Orthodontic traction of the maxilla with a face mask and distalization of the mandible with microimplants presents a very effective Class III malocclusions treatment, minimizing the need for orthognathic surgery treatments.

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