ATHENEA
DENTAL INSTITUTE

ORTHODONTIC JOURNAL ATHENEA

Barcelona, Spain

Rzeszów, Poland

VOL 2, Nº 1, 2020
ENGLISH

ATHENEA DENTAL INSTITUTE

Vol. 2, N° 1, 2020
www.atheneainstitute.com
Editor: Athenea Dental Institute

Summary

Editorials 4

Advertising 8

Orthodontic root resorption. Dr. Katarzyna Gruszka 10

Case report: Treatment of Skeletal Class II Maloclussion. Dr. Ewelina Wójcicka 18

Case report with CA© Clear Aligner technique and after periodontal and prosthetic treatment. Dr. Víctor Orozco 27

Patient in mixed dentition treated in a 1st phase that will be treated in a 2nd phase with fixed appliancest. Dr. Víctor Orozco 31

Case Report: The use of reverse chin cup for skeletal class III treatment. Dr. Pablo Eccharri 35

Dr. Ayham Mohsin
Coordinator of Master in Orthodontics and Dentofacial Orthopedics. Athenea Dental Institute in Rzeszów (Poland) and San Jorge University.

Dear Colleagues,

With A Great Satisfaction we introduce to You the second edition of Athenea Dental Journal ,and we hope you will find something of your interest in this journal .

It became a tradition to organize the conference of Athenea Dental Institute during Krakdent every year, this year we have prepared the third conference of Athenea Dental institute in Krakdent.

Since its Foundation , Athenea Dental Institute ,is offering Different Courses with the highest Standards in Dental Education.

With a worldwide known Teaching Professors onboard Athenea provides one of the best orthodontic programs in the world.

The Program of the Master of orthodontics is organized in such a way that doctors can start learning orthodontics in a very easy and well organized way ,with three days meetings every two weeks it can be easily combined with professional work.

Divided into theory and practice with patients , the program leads the doctors through all steps of orthodontic treatment starting with first consultation through diagnostics and treatment procedures.

The Program of the master also helps the doctors to go through the problems of managing the occlusion in orthodontic patients, a subject that is new in the field of orthodontics in Poland.

Athenea Dental Institute has developed its own evidence based treatment procedures which were developed by Dr.Pablo Echarri from Barcelona.

With his 30 years of experience in Teaching excellence in Orthodontics worldwide Dr.Pablo Echarri is the Director of the Master program in Athenea Dental Institute.

We are very proud to announce that last January Athenea started the forth edition of The Master of orthodontics in Poland .

14 Doctors mainly from Poland has started their journey with orthodontics.

Each doctor are able to treat 10 patients with a variety of malocclusions under the supervision of Athenea Dental Institute Professors ,in our Partner clinic Ortodent in Rzeszów.

The Master is in English ,which makes it available for international Students and The Students finish the master program by presenting a master thesis in one of variety of subjects in the field of orthodontics.

I would like to invite you to discover our Master of orthodontics in details by joining us.

Sincerely

Ayham Mohsin

Dr. Radosław Maksymowicz
Coordinator and professor of the Master of Implatology at Athenea Dental Institute and San Jorge University.

Dear Colleagues,

With great joy and personal satisfaction I can inform you about the next educational project initiated in Poland for dentists. The Master of Implantology postgraduate studies implemented in cooperation with the Spanish teaching institution Athenea Dental Institute from Barcelona / Badalony, and validated by the University of San Jorge in Zaragoza the Master have gained momentum. Students, dentists, participants of the first edition already have the third of monthly reunions and the first exam behind them. However, managed to create opportunities for them to acquire comprehensive and broad knowledge in this fascinating and relatively new field of dentistry, the organizers had to do a lot of preparatory work.

The first introductory meetings took place over two years ago during visits to the lecturer Dr. Pablo Echarri, known in the world as well as in our country, and after meeting with the Director of Studies prof. Javier González Lagunas. verification of the possibilities that make up this project took place and in April 2019 a cooperation agreement was signed, the fruit of which our students can use.

In October 2019, the first congress of the first edition of Master in Implantology studies took place in Rzeszów. A series of theoretical and practical classes takes place in Poland (mainly in Rzeszów) and a minimum of one congress during the study period is planned in Barcelona. Classes during studies are conducted in English, which means that doctors from other European countries can be interested in this form of study. The Teaching staff are of international lecturers in addition to recognized Spanish doctors and Polish well known Lecturers, and periodically also lecturers from other countries.

Studies last two years and provide 60 ECTS credits. The rich and diverse subjects of classes, from digital planning, digital photography through implantological templates, CAD-CAM, occlusion to maxillofacial surgery procedures. A small group of students and a variety of teaching materials available guarantee the necessary and extensive knowledge. Three-day monthly reunions allow you to combine education with work quite easily and the acquired knowledge can be almost immediately used in your own practice.

As part of the study, practical classes take place, under the supervision of an experienced implantologists, doctors can treat patients using the latest knowledge and various implant prosthetic techniques.

We are soon starting recruitment for the second edition of the studies.

I invite you cordially

Lek.dent. Radoslaw Maksymowicz

Additional information is available on the site: https://atheneainstitute.com/pl/master-implantologii/

Dr. Miguel Ángel Pérez Campoy
Coordinator and professor of the Master of Orthodontics and Dentofacial Orthopedics at Athenea Dental Institute and San Jorge University.

Dear colleagues,

It is an honor for me to write for you in the second number of Athenea Dental Journal. It is very satisfactory for me to see the progress of Athenea Dental Instititute in dental courses and also in publications.

Regarding our next big new in dental training, I would like to introduce you the Master in Interdisciplinary Orthodontics that has been prepared in Athenea Dental Institute during a long time.

Finally, after finishing the validation process of San Jorge University, it is possible to start it and we can not feel more happiness about that. This new Master in Interdisciplinary Orthodontics is specially recommended to orthodontists that want to get deeper knowledge about orthodontics in close relationships with other dental disciplines. The program of this master has been designed to carry out orthodontic interdisciplinary treatments that are so common nowadays in our dental office, and demanded by adult patients.

Nowadays more adult people demand orthodontic treatment not only for the correction on their maloclussions but also for their aesthetic expectations, that are extremely high. In many cases they also have periodontal problems, partial edentulism, retained teeth that need surgical treatment and

other dental conditions or pathologies. In these situations, orthodontic treatment can not be successful enough if we don't work closely with other dental specialties.

The main objective of the Master in Interdisciplinary Orthodontics is to give to the student the needed knowledge to treat these complicated cases in their own dental office, giving to them also knowledge about prosthesis, surgery, periodontics and aesthetic dentistry, in order to arrive to the excellence in the interdisciplinary orthodontic treatments.

The Master in interdisciplinary Orthodontics has a total of 60 ECTS and they will be accomplished by one module of three days per month. We will start in Septembre 2020 not only in Barcelona but in Rzeszów also. It will be a great opportunity to see again the students that we had in our Master in Orthodontics of 90 ECTS and also to meet other orthodontics that want to trust us in their dental training regarding interdisciplinary treatment.

Kind regards.

Miguel Ángel Pérez Campoy

Mr. Francisco Javier Cabeza Loriente
Managing Director of Athenea Dental Institute

A group to be closer to you.

Athenea continues to grow. And we do it with the intention of offering dentists and patients an increasingly better and more complete service. We present **ATHENEA DENTAL GROUP**, the new brand under which we integrate all our activities.

• **Athenea Dental Institute** concentrates all the training activity and offers you a complete catalog of postgraduate courses in dentistry in several countries such as Spain, Poland, Portugal, Ukraine or Thailand.

• **Athenea Dental Labs** includes reference laboratories in the sector such as the **Orthodontics Center and ATM Ladent**, a specialist with more than 30 years of experience in Spain with integral orthodontic solutions and the NZOZ Ortodent laboratory, one of the most recognized in the sector in Poland.

• **Athenea Dental Clinics** is the brand under which our dental clinics are included, which focus on the excellence of patient treatment. They are located in Barcelona (Spain) and Rzészow (Poland), the latter under the Ortodent brand.

• **Athenea Dental Books** reflects our willingness to make our knowledge accessible to the entire sector through books and publications, such as this journal, of high technical quality.

We know that growth must be organic to be good. We do not want to run and lose that feature that we think characterizes us: the dentist and his needs, proximity and trust as a way of being. Our priority is that they feel part of the **Athenea Dental Group** family. In every graduation ceremony held by the Athenea Dental Institute, this aspect is one of the characteristics that our students have stated stands out the most: closeness, confidence, security, and the comfort that comes with knowing what it's like to be part of a tight knit humane team that cares. To all of them, thank you very much for the recognition that this implies.

At **Athenea Dental Group** we are aware that training in our dental practice must be consistent but fun and engaging throughout the length of our entire professional stage. That difficult cases are challenges that should serve to improve the quality of life for our patients but also as our own satisfaction for overcoming complicated challenges.

Therefore, we propose that the treatment must be advanced and interdisciplinary: from the implant to the aesthetic, through orthodontics and as many other fields as necessary. From the treatment with the patient; attentive quality care, to the incorporation of the professional in his relationship with the laboratory. A specialist and quality laboratory that understands and, above all, satisfies the needs of the dentist from an experience to a technical knowledge standpoint.

We also have an international vocation. We are committed to projects in various countries. To those already consolidated in Spain and Poland in which we already offer most of our courses, new training projects are joined in Lviv (Ukraine), Porto (Portugal) and Bangkok (Thailand), which will be released throughout 2020. To this we can add the collaborative agreements in Canada and South Korea, which allow our students to benefit from clinical stays.

In these pages we want to convey part of this vision. Cases that present challenges and singularities. Or that allow us to influence fundamental aspects of the treatment. Cases made by our teaching team, collaborators or students.

ATHENEA DENTAL INSTITUTE

MASTER OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS

Master of Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute is a coursework program aimed at students who want to obtain the adequate professional training which will help them to manage the malocclusion cases which require advanced orthodontic treatments. It is a 2 year theory & hands-on master program validated by the University San Jorge which offers 90 credit points (ECTS), and which you can easily combine with your professional practice.

Objectives:

- To carry out diagnosis, ethiopatogenetic diagnosis, to plan the treatment of different malocclusions.
- To carry out orthodontic and orthopedic treatments.
- To carry out the orthodontic part in interdisciplinary treatments, taking part in a medical team.
- To organize orthodontic services or to be a part of a specialty services.

Validated by universidad SANJORGE GRUPO SANVALERO

MASTER OF INTERDISCIPLINARY ORTHODONTICS

This Master in Interdisciplinary Orthodontics of Athenea Dental Institute, counts with theory classes, preclinical practice and clinical practice on patients. It is a hands-on master program in the first place, so, apart from the orthodontic treatments on patients, the student will also be able to carry out different clinical treatments such as unit implants, prosthesis, veneers, teeth whitening, periodontal surgery, TMJ, OSAH, wisdom teeth extraction, etc.

Credits: 60 ECTS.
Start: September 2020.
Venue: Rzeszów, Poland
Language: Spanish (Spain) English (Poland)

Validated by universidad SANJORGE GRUPO SANVALERO

EXPERTISE IN ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS

The objectives of this theory/hands-on course are:

- To make up for the deficient education of graduates in Dentistry related to the field of Orthodontics and Orthopedics.
- To train students how to face with necessary conviction and quality the situations which require the treatments of mild and moderate malocclusions.
- To train students in working as a part of an interdisciplinary team, carrying out orthodontic and orthopedic treatments.

The special objectives of this University Expertise Program consist of achieving the specific competences related to orthodontic and orthopedic services.

Credits: 20 ECTS.
Start: October 1-3, 2020
Type: 6 Modules of 3 days
Venue: Warsaw, Poland
Language:: English

Dates:
Module 1: October 1-3, 2020
Module 2: November 5-7, 2020
Module 3: January 14-16, 2021
Module 4: March 4-6, 2021
Module 5: May 6-8, 2021
Module 6: June 10-12, 2021

Validated by universidad SANJORGE GRUPO SANVALERO

info@atheneainstitute.com
www.atheneainstitute.com

ATHENEA DENTAL LABS

tworzenie jest naszą pasją

ortodent LAB

CLEAR ALIGNER

Aparaty Ruchome, Stałe

Termoformowanie

Centrum Druku 3D

ul. Rejtana 9, 35-326 Rzeszów, tel. 795201656, 177798715, e-mail: pracownia@ortodent.pl
www.clearaligner.pl https://www.facebook.com/LaboratoriumOrtodent/ www.ortodent.pl

Orthodontic root resorption

Dr. Katarzyna Gruszka
Phd. DDS Alumni of Athenea Master in Orthodontics and Dentofacial Orthopedics. Athenea Dental Institute and San Jorge University.

Pablo Echarri
Director of Master in Orthodontics and Dentofacial Orthopedics. Athenea Dental Institute and San Jorge University.

Ayham Mohsin
Coordinator of Master in Orthodontics and Dentofacial Orthopedics. Athenea Dental Institute in Rzeszów (Poland) and San Jorge University.

Miguel Ángel Pérez Campoy
Coordinator of Master in Orthodontics and Dentofacial Orthopedics. Athenea Dental Institute in Barcelona (Spain) and San Jorge University.

Key words: orthodontic, root resorption, orthodontic force, time of orthodontic treatment

Abstract

Root resorption is the loss of root structure that involves mineralized and non-mineralized dentine and cementum. It might be a physiological process during the exfoliation of decidous teeth or might be a pathology. Pathological root resorption can be internal or external. IL-6 and IL-7 increased significantly orthodontic root resorption, especially with high level force application. Force higher than 100g provokes root resorption and this situation is higher with higher orthodontic forces. Root resorption decreased when a pause during orthodontic treatment is given. Also, two weekly reactivations of continous orthodontic force can lead to less resorption than 3 weekly reactivations. In this review treatment of patients without resorption was 1,5 years and severe root resorption was showed during the orthodontic treatment over 2,3 years. With long duration of fixed appliance treatment, the risk of severe resorption increases.

Introduction

In medicine resorption means the disapperance of the hard substances anywhere in the body. However, in the dental studies this term was used to describe the disapperance at the end of the apices of roots of the decidous teeth, when the same process in the permanent teeth was called absorption. That was untill 1925 when the Committee on Nomenclature of the American Association of Dental Schools defined at the meeting of the American Association (ADA), “absorption” as the taking up by the tissues of fluids orginating outside the body and “resorption” as the taking up the products or tissues orginating the body.

Root resorption is the loss of root structure that involves mineralized and non-mineralized dentine and cementum. It might be a physiological process during the exfoliation of decidous teeth or might be a pathology. Pathological root resorption can be internal or external.

It depends on afected part of the tooth. Internal root resorption starts from the cells of the pulp and then go to the internal wall of the dentin. However, external root resorption starts from the cementum and affects the surfaces of the root. [1]

The first who discuss about root resorption in permanent teeth, calling “absorption of the roots” was Bates. In 1914 Ottolengui related the root resorption to orthodontic tooth movement. In 1927 Ketcham proved that orthodontic treatment in the relation with root resorption and it can be seen on the x-ray radiograph. Ketcham evaluated 385 orthodontic cases and demonstrated with x-rays that at the beginning and at the end of the treatment there are root shape changes after completion of orthodontic treatment. [2]

Classification of root resorption

Acording to Andreasen (1988) external root resorption is divided into:

1. Surface resorption – involves small areas, previous resorption defects of the root are covered with new cementum of the periodontal ligament
2. Inflamatory resorption - large resorption defects, where root resorption has reached dentinal tubules of an infected necrotic pulp or an infected leukocyte zone
3. Replacement resorption – it happens when bone replaces the resorbed areas resulting ankylosis

Acording to Tronstad (1988) root resorption is divided into:

1. Inflamatory resorption – shows when predentin or precementum becomes mineralized or when the precementum is scraped off or mechanically damaged. It might be internal (taking place on the wall of the root canal) or external (surface of the root).
2. Transient inflammatory resorption – seen in traumatized teeth and in the teeth that have orthdontic or periodontal treatment. This resorption cannot be seen on the radiograph and is repaired by cementum tissue.
3. Progressive inflammatory resorption – this term is used when the stimulation is for a long time and it can be seen radiographically as shortening of the roots.
4. Replacement resorption – ankylosis it shows after extensive necrosis of the periodontal ligament and leads to bone formation onto a denuded surface of the root. [1-4]

Root resorption can be diagnosed by radiographic examination with 2D methods and 3D methods. CBCT allow us to evaluate external root resorption in whole root surface. [6-15,39]

Malmgren at al. introduced an index for the quantitive assesment of root resorption with scores ranging from 0 to 4.

0 – no sign of root resorption

1 – irregular root contour

2 – root resorption apically amounting to less than 2 mm of the original root lenght

3 – root resorption apically from 2 mm to 1/3 of original root lenght

4 – root resorption more than 1/3 of the original root lenght. [16]

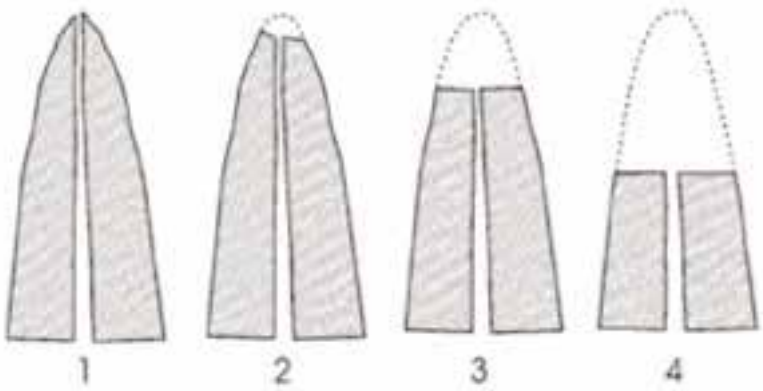


Fig. 1. An index for the quantitive assesment of root resorption acording to Malmgren.

Objectives

Does orthodontic treatment beyond two years increase significanly the risk of root resorption?

Does Orthodontic treatment with self-ligating brackets provoke less root resorption than orthodontic treatment carried out with conventional brackets?

Does orthodontic forces higher than 60 grams increase significanly the risk of root resorption?

Materials and methods

An enhancement in knowledge was first done by literature reading on the subject. The pubmed database was used to search for information from published literature. Finally, the search was limited to human studies.

The keywords used were “orthodontic” and “root resorption”. This search gave 1458 results. 53 studies were chosen. From this records 10 studies were rejected. Most of the articles were not older than 10 years old.

43 studies were evaluated in total as relevant and valid and they were included in the assignment.

Results

Makedonas14 published in 2013 an article. The sample was 156 patients, with age between 11 to 18 years old. He used fixed appliances. Treatment plan was leveling and alignment with extraction of 4 premolars. The duration of the treatment was 6 months. Results showed no corelation between severity of root resorption after 6 months and at the end of the treatment. Minor resorption was diagnosed in 52,5% patients, clinically significant resorption was diagnosed in 25,6% of patients and extreme root resorption was find at one person.

Apajalahti17 published in 2007 an article. The sample was 625 patients, 269 males and 356 females, with age between 8 to 16 years old. He used removable and fixed appliances. The duration of the treatment was between 1,5 to 2,3 years. The mean duration of treatment in patients without resorption was 1,5 years, whereas in those with severe root resorption was 2,3 years. The conclusion was that with long duration of fixed appliance treatment, the risk of severe resorption increases. Maxillary incisors showed apical root resorption most frequently. Root resorption was corelated with fixed appliances. The most severe resorption was seen in the maxillary incisors and premolars.

Kreich18 published in 2016 an article. The sample was 79 patients, 22 males and 57 females, with age between 10 to 19 years old (average of 13,5±2,2). He used fixed appliances during the treatment, which had a duration from 10 to 38 months (average 25,8±6,2). Results showed that the tooth length before and after treatment was 302,9±30.3 pixels and 287,2±32,3 pixels. Root resorption was found around 5,1 %.

Hwang [19] published in 2017 an article. Number of patients was 28, 5 males and 23 females, with age between 19 – 29(average 22,2). Traditional orthodontic treatment with extraction was carried out in 28 patients, (20±4,68) and anterior segmental osteotomy with extraction in 22 (05±5,99). Results were lesser root resorption and shorter treatment duration with ASO than with conventional orthodontic treatment. ASO can be an effective treatment option when the amount of root resorption is expected to be high, especially in late adults. With conventional treatment tooth length decreased from 26,07±1.71 to 24,46±1,52 with anterior segmental osteotomy was from 25,07±2,26 to 24,11±2,12. It was statistically significant for ASO root resorption was 0,93±0,62, however for traditional treatment was 1,61±0,45.

Sepanian[20] published in 2018 an article. Number of patients was 46 (28 females, 18 males) with age between 11-16,7. The treatment was: One-phase treatment with fixed appliance and two-phase treatment (removable and fixed appliance). Treatment plan was conventional brackets and class II elastics without extractions. The duration with one-phase treatment was 27,20 months and two-phase treatment was 30,61 months. Patients in the one-phase treatment showed significantly more root resorption than patients in the two-phase treatment for the lower incisors. For class II division 2 patients, two-phase treatment is a good option. Root resorption was: 31%- one-phase treatment; 7,7% - two-phase for the lower central incisor and 26,2% -one- phase 8% - two-phase for the lower lateral incisors.

Nassif[21] published an article in 2017. Number of patients was 40(12 males and 28 females) with age between 11-45. Treatment was carried out in 20 patients with conventional brackets and in 20 patients with lingual brackets. Alignment and leveling was about 5-10 months. The magnitude of apical root resorption in the maxillary incisors was similar of the lingual and conventional. Both techniques resulted in apical rounding. In lingual technique: the root change in length was for tooth 11- 0,35mm for tooth 12- 0,63 mm. In labial technique: the root change in length was for tooth 11- 0,66 mm for tooth 21- 0,85 mm.

Janson[22] published an article in 2000. Number of patients was 90 (30 for each group). 1- standard edgewise2- straight wire and 3-bioefficient therapy. Bioefficient therapy presented less root resorption than others. Superelastic wires were responsible for that situation. Slight root resorption was found in - 42,56% of the cases. Moderate root resorption was found in - 3,37% and extreme root resorption in - 0,42%.

Handem[23] published in 2016 an article. Number of patients was 52(27 males, 25 females) with age between 16,77 years old and Class I malocclusion. 1st group of patients was treated with self-ligating brackets Damon and the 2nd group was treated with conventional brackets. The duration of the treatment was 2,02 years for 1st group and 1,70 years for 2nd group. The results were: no significant difference in the external root resorption between SL-Damon and conventional bracket system. In 49,7%- no resorption was found, in 37,7%- mild resorption was found, in 10,5% - moderate resorption was found and in 1,92% - accentuated root resorption was found.

Wang [28] in 2017 compared 28 patients with invisible aligners and conventional brackets. After the treatment patients using aligners suffered less root resorption: 43,3% - aligners, 68,3%- conventional treatment after 6 months and at the end of the treatment 68,3% - aligners 85,3% - conventional.

Sepanian[20] in 2017 published an article. Number of patients was 74 (46 females, 28 males) Class II division 2. He compared one-phase treatment and two-phase treatment. One-phase treatment showed significantly more root resorption compared to two-phase treatment

Liu Y [29] in 2016 published an article. Number of patients was 50. He compared the PSL brackets and conventional bracket. In the results was no significant difference between PSL and conventional bracket.PSL and conventional bracket can cause root resorption.

Martins [16] in 2012 published an article. Number of patients was 56(24 females, 32 males) with age between 11,16-19,33 (13,27±1,85). Treatment with extractions and intrusion, reverse curve of Spee and treatment with extractions without intrusion was carried out. The duration of the treatment was 29,43 month. Statistically significant positive corelation of root resorption with initial overbite severity and the amount of correction was found and root resorption with intrusion 36,05 (2,37) but without intrusion 20,94 (1,69).

Pudic[7] in 2017 published an article. Number of patients was 30 (20 females, 10 males) with age between 11,3 – 43. 19x25 TMA sectional wire with 1N of initial buccal activation1 N8 weeks was carried out. The result was that the application of 1N

force over 2 month provokes severe root resorption (0,00055mm 3).

Ahuja[15] in 2017 published an article. Number of patients was 8 (6 males and 2 females) with age between 13,9-22.9 and Class I malocclusion. Treatment was carried out with 17x25 TMA and bucal force of 225g during 28 days. IL-7, TNFα increased secondary to hight-level orthodontic force application. Root resorption was between 0,15-0,35 mm3.

Silva [4] in 2016 published an article. Number of patients was 16 (9 males and 7 females) with age between 11,8-14,2 years old. Treatment plan of impacted canines was carried out and the duration of the treatment was 5 years and 11 months. This treatment had minimal effect on root length and buccal and palatal alveolar bone levels, decreased root length was found in 67,18% - 0,63mm.

Guo[9] in 2015 published an article. Number of patients was 174(68 males and 106 females) with age between 12-34 years old. Treatment was carried out with straight archwire technique with high elastic NiTi and forces lighter than 100g for 14 - 28 months. In the results IL-6 was found as a risk factor for external apical root resorption. Root resorption was about 32,97 mm3 (average 12,59±6,27 mm3.)

Zahrowski[32] published in 2010 an article about Class II treatment. He compared intrusive versus extrusive movements and light forces (25g) versus heavy forces (225 g). Root resorption was higher with high forces – 225g than with light forces – 25g.

Harris [33] in 2006 published an article. Number of patients was 27 (12 males and 15 females) with age between 11,9-19,3 years old. Treatment with fixed appliance (segmented technique) was carried out, using low- (25g) or high- (225g) forces. There was also a control group – (0g) and the duration of the treatment was 4 weeks. Root ressorption in the light and high force was 2 and 4 times higher than control group. It was showed more on the mesial-apical and distal-apical surface of the roots.

King [33] in 2011 published an article. Number of patients was 15 (4 males and 11 females) with age between 12,8-16,11(14,2 y) years old. Treatment was carried out with fixed appliance (segmented technique). Force was 2,5° versus 15° of distal tipping. The duration of the treatment was 4 weeks. Greater root resorption was found in teeth that had greater distal root tip bends. Tension and compresion of the periodontal ligament caused more root resorption, that was more pronounced in the apical and cervical thirds of the teeth.

Montenegro [33] in 2012 wrote an article. Number of patients was 10(3 males and 7 females) with age between 12-18 years old. Treatment with fixed appliance (segmented technique) was carried out. The force was low- (25g) and high- (225g) and the duration of the treatment was 4 weeks. More root resorption was found in the heavy force group than in the light force group. Distal surfaces of the roots were more affected than others.

Conclusions

Accordint to the results of this review, orthodontic treatment beyond two years increases significanly the risk of root resorption, but it is not clear that orthodontic treatment with self-ligating brackets provokes less root resorption than orthodontic treatment carried out with conventional bracket.

Also, it was demonstrated that orthodontic forces higher than 60 grams increases significanly the risk of root resorption.

Regarding other considerations it is clear that:

- IL-6 and IL-7 increased significantly orthodontic root resorption, especially with high level force application.
- Force higher than 100g provokes root resorption. Root resorption is higher with higher orthodontic forces.
- Root resorption decreased when a pause during orthodontic treatment is given. Two weekly reactivations of continous orthodontic force can lead to less resorption than 3 weekly reactivations.
- Treatment of patients without resorption was 1,5 years. Severe root resorption was showed during the orthodontic

treatment over 2,3 years. With long duration of fixed appliance treatment, the risk of severe resorption increases.

- If any apical external root resorption is detected, active treatment should be suspended for 2 to 3 months, to prevent further resorption and allow the healing with cellular cementum.
- Orthodontic root resorption, specially in maxillary central incisors is lower in self-ligating than in conventional brackets. 1mm of resorption during 12 months of treatment is clinically significant.
- Aligners provoke less resorption than fixed appliances.
- Passive self-ligating and conventional brackets can provoke root resorption but the difference is not significant.

References

1. Tronstad L. Root resorption-etiology, terminology and clinical manifestations. Endod Dent Traumatol. 1998;4:241-252
2. Ramanathan C, Hofman Z. Root resorption in relation to orthodontic tooth movement. ActaMedica. 2006;49(2):91–5.
3. Pizzo G, Licata ME, Guiglia R, Giuliana G. Root resorption and orthodontic treatment. Review of the literature. Minerva Stomatol. 2007 Jan-Feb;56(1-2):31-44.
4. Silva AC et all. Root length and alveolar bone level of impacted canines and adjacent teeth after orthodontic traction: a long-term evaluation. J Appl Oral Sci. 2017;25(1):75–81.
5. Brezniak N, Wasserstein A. Orthodontic Root Resorption: A New Perspective. Angle Orthod. 2016;86(6):1056–7.
6. Al J et. Update of 2010 Cochrane-Initial Archwires. 2013;(4).
7. Pudic A, Giannopoulou C, Meda P, Montet X, Kiliaridis S. Orthodontically induced cervical root resorption in humans is associated with the amount of tooth movement. Eur J Orthod. 2017 Oct; 39(5):534 – 540
8. Feller L, Khammissa RAG, Thomadakis G, Fourie J, Lemmer J. Apical External Root Resorption and Repair in Orthodontic Tooth Movement: Biological Events. Biomed Res Int. 2016;2016
9. Guo Y, He S, Gu T, Liu Y, Chen S. Genetic and clinical risk factors of root resorption associated with orthodontic treatment. Am J OrthodDentofacialOrthop. 2016 Aug;150(2):283-9.
10. Ahuja R, Almuzian M, Khan A, Pascovici D, Dalci O, Darendeliler MA. A preliminary investigation of short-term cytokine expression in gingival crevicular fluid secondary to high-level orthodontic forces and the associated root resorption: case series analytical study. ProgOrthod. Progress in Orthodontics; 2017;18(1).
11. Iglesias-Linares A, Morford LA, Hartsfield J Jr. Bone Density and Dental External Apical Root Resorption. CurrOsteoporos Rep. 2016 Dec; 14(6): 292–309.
12. Yao-Umezawa E, Yamaguchi M2, Shimizu M, Kikuta J, Suzuki K, Kasai K. Relationship between root resorption and individual variation in the calcium/phosphorous ratio of cementum. Am J OrthodDentofacialOrthop. 2017 Oct;152(4):465-470.
13. Rakhshan V, Nateghian N, Ordoubazari M. Risk factors associated with external apical root resorption of the maxillary incisors: a 15-year retrospective study. AustOrthod J. 2012 May;28(1):51-6.
14. Makedonas D, Lund H, Hansen K. Root resorption diagnosed with cone beam computed tomography after 6 months and at the end of orthodontic treatment with fixed appliances. Angle Orthod. 2013;83(3):389–93.
15. Ahuja PD, Mhaske SP, Mishra G, Bhardwaj A, Dwivedi R, Mangalekar SB. Assessment of Root Resorption and Root Shape by Periapical and Panoramic Radiographs: A Comparative Study. J Contemp Dent Pract. 2017 Jun 1;18(6):479-483.
16. Martins DR, Tibola D, Janson G, Torres Maria FR. Effects of intrusion combined with anterior retraction on apical root resorption. Eur J Orthod. 2012;34(2):170–5.
17. Apajalahti S, Peltola JS. Apical root resorption after orthodontic treatment-a retrospective study. Eur J Orthod. 2007;29(4):408–12.

18. Kreich EM, Chibinski AC, Coelho U, Wambier LS, De ArrudaMouraZedebski R, De Moraes MEL, et al. A posteriori registration and subtraction of periapical radiographs for the evaluation of external apical root resorption after orthodontic treatment. Imaging Sci Dent. 2016;46(1):17–24.

19. Hwang B-Y, Choi B-J, Lee B-S, Kwon Y-D, Lee J-W, Jung J, et al. Comparison between anterior segmental osteotomy versus conventional orthodontic treatment in root resorption: a radiographic study using cone-beam computed tomography. MaxillofacPlastReconstr Surg. Maxillofacial Plastic and Reconstructive Surgery; 2017;39(1):34.

20. Sepanian VF, Sonnesen L. Incisor root resorption in class II division 2 patients in relation to orthodontic treatment. Eur J Orthod. 2017

21. Nassif CE, Cotrim-Ferreira A, Conti ACCF, Valarelli DP, De Cardoso MA, De Almeida-Pedrin RR. Comparative study of root resorption of maxillary incisors in patients treated with lingual and buccal orthodontics. Angle Orthod. 2017;87(6):795–800.

22. Janson GR, De Luca Canto G, Martins DR, Henriques JF, De Freitas MR. A radiographic comparison of apical root resorption after orthodontic treatmentwith 3 different fixed appliance techniques. Am J OrthodDentofacialOrthop. 2000 Sep;118(3):262-73.

23. Handem RH, Janson G, Matias M, de Freitas KMS, de Lima DV, Garib DG, et al. External root resorption with the self-ligating damon system—a retrospective study. ProgOrthod. Progress in Orthodontics; 2016;17(1):1–6.

24. Iglesias-Linares A, Sonnenberg B, Solano B, Yañez-Vico RM, Solano E, Lindauer SJ, et al. Orthodontically induced external apical root resorption in patients treated with fixed appliances vs removable aligners. Angle Orthod. 2017;87(1):3–10.

25. Krieger E, Drechsler T, Schmidtmann I, Jacobs C, Haag S, Wehrbein H. Apical root resorption during orthodontic treatment with aligners. A retrospective radiometric study. Head Face Med. 2013;9(1):1–8.

26. Gay G, Ravera S, Castroflorio T, Garino F, Rossini G, Parrini S, et al. Root resorption during orthodontic treatment with Invisalign®: a radiometric study. ProgOrthod. Progress in Orthodontics; 2017;18(1):0–5.

27. Chen W, Haq AAA, Zhou Y. Root resorption of self-ligating and conventional preadjusted brackets in severe anterior crowding Class I patients: A longitudinal retrospective study. BMC Oral Health. BMC Oral Health; 2015;15(1):1–6.

28. Wang G, Yang L, Zhang YF, Luo SL, Zheng JW. A retrospective study on incisor root resorption in patients treated with bracketless invisible appliance and straight wire appliance. Shanghai Kou Qiang Yi Xue. 2017 Feb;26(1):121-124.

29. Liu Y, Guo HM. Comparison of root resorption between self-ligating and conventional brackets using cone-beam CT.Shanghai Kou Qiang Yi Xue. 2016 Apr;25(2):238-41.

30. Mohandesan H, Ravanmehr H, Valaei N. A radiographic analysis of external apical root resorption of maxillary incisors during active orthodontic treatment. Eur J Orthod. 2007;29(2):134–9.

31. de Almeida MR, Marçal ASB, Fernandes TMF, Vasconcelos JB, de Almeida RR, Nanda R. A comparative study of the effect of the intrusion arch and straight wire mechanics on incisor root resorption: A randomized, controlled trial. Angle Orthod. 2017;88(1):06417–424R

32. Zahrowski J, Jeske A. Apical root resorption is associated with comprehensive orthodontic treatment but not clearly dependent on prior tooth characteristics or orthodontic techniques. Am J OrthodDentofacialOrthop. 2010;137(4):462-476.

33. Roscoe MG, Meira JB, Cattaneo PM. Association of orthodontic force system and root resorption: A systematic review. Am J OrthodDentofacialOrthop. 2015 May;147(5):610-26.

34. Yi J, Li M, Li Y, Li X, Zhao Z. Root resorption during orthodontic treatment with self-ligating or conventional brackets: A systematic review and meta-analysis. BMC Oral Health. 2016;16(1):1–8.

35. Jiang F, Chen J, Kula K, Gu H, Du Y, Eckert G. Root resorptions associated with canine retraction treatment. Am J OrthodDentofacialOrthop. 2017 Sep;152(3):348-354.

36. Elhaddaoui R, Qoraich HS, Bahije L, Zaoui F. Orthodontic aligners and root resorption: A systematic review. IntOrthod. 2017 Mar;15(1):1-12.

37. Aminoshariae A, Aminoshariae A, Valiathan M, Kulild JC. Association of genetic polymorphism and external apical root resorption. Angle Orthod [Internet]. 2016;86(6):1042–9.

38. Tehranchi A, Sadighnia A, Younessian F, Abdi AH, Shirvani A. Correlation of Vitamin D status and orthodontic-induced external apical root resorption. Dent Res J. 2017 Nov-Dec; 14(6): 403–411.

39. Nakada T, Motoyoshi M, Horinuki E, Shimizu N. Cone-beam computed tomography evaluation of the association of cortical plate proximity and apical root resorption after orthodontic treatment. J Oral Sci. 2016;58(2):231–6.

40. Darendeliler MA, Kharbanda OP, Chan EKM, Srivicharnkul P, Rex T, Swain MV et al. Root resorption and its association with alterations in physical properties, mineral contents and resorption craters in human premolars following application of light and heavy controlled orthodontic forces. Ortho Craniofac. Res. 2004 May; 7(2): 79-97.

41. Brusveen EM(1), Brudvik P, Bøe OE, Mavragani M. Apical root resorption of incisors after orthodontic treatment of impacted maxillary canines: a radiographic study. Am J OrthodDentofacialOrthop. 2012 Apr;141(4):427-35.

42. Krishnan V. Root Resorption with Orthodontic Mechanics: Pertinent Areas Revisited. AustDent J. 2017 Mar;62 Suppl 1:71-77.

43. Maeda-Iino A, Furukawa M, Kwon S, Marutani K, Nakagawa S, Fuchigami T, et al. Evaluation of maxillary central incisors on the noncleft and cleft sides in patients with unilateral cleft lip and palate-Part 2: Relationship between root resorption, horizontal tooth movement, and quantity of grafted autogenous bone. Angle Orthod. 2017;87(6):863–70.

44. Yadav S, Dobie T, Assefnia A, Kalajzic Z, Nanda R. The effect of mechanical vibration on orthodontically induced root resorption. Angle Orthod. 2016;86(5):740–5.

45. Rey D, Smit RM, Gamboa L. Orthodontic treatment in patient with idiopathic root resorption: A case report. Dental Press J Orthod. 2015;20(1):108–17.

46. An JK, Matsumoto Y, Ono T. The relationships between the arrangement of teeth, root resorption, and dental maturity in bovine mandibular incisors. Korean J Orthod. 2017;47(6):365–74.

47. Jing D, Xiao J, Li X, Li Y, Zhao Z. The effectiveness of vibrational stimulus to accelerate orthodontic tooth movement: A systematic review. BMC Oral Health. 2017;17(1):1–9.

48. Teen T, Huang Y, Elekdag-Turk S, Dalci O, Almuzian M, Ilsay E, et al. The extent of root resorption and tooth movement following the application of ascending and descending magnetic forces: a prospective split mouth, microcomputed-tomography study. Eur J Orthod. 2017 Oct; 39(5):547–553

49. Zhou J, Hu H, Huang R. A pilot study of the metabolomic profiles of saliva from female orthodontic patients with external apical root resorption. ClinChimActa. 2017 Dec; S0009-8981(17): 30545-4.

50. FaxénSepanian V, Sonnesen L. Incisor root resorption in class II division 2 patients in relation to orthodontic treatment. Eur J Orthod. 2017 Nov 17.

51. Lisboa CO, Borges MS, Medeiros PJD, Motta AT, Mucha JN. Orthodontic-surgical retreatment of facial asymmetry with occlusal cant and severe root resorption: A 3-year follow-up. . Am J OrthodDentofacialOrthop. 2017 Aug;152(2):268-280.

52. Janson G, Niederberger A, Garib DG, Caldas W. Root resorption in Class II malocclusion treatment with Class II elastics. Am J OrthodDentofacialOrthop. 2016 Oct;150(4):585-591.

53. Pasternak-Júnior B, Delai D, Oliveira CAP, Kopper PMP. External resorption of a maxillary incisor associated with a canine with a deviating eruption path: a case report. Gen Dent. 2018 Jan-Feb;66(1):e1-e4.

Case report: Treatment of Skeletal Class II maloclussion

Patient with permanent dentition treated with a Twin Force to advance the mandible.

Dr. Ewelina Wójcicka
Clinical professor of the Master of Orthodontics and Dentofacial Orthopedics at Athenea Dental Institute and San Jorge University.

Summary

A 14 years old patient presenting bilateral molar and canine class II, skeletal class II, mandibular retrognatia and mild dolychofacial pattern. The chief complaint is the presence of gummy smile and retruded chin.

Fig. 1. Facial frontal initial picture.

Fig. 2. Facial frontal “smiling” initial picture.

Fig. 3. Facial profile initial picture.

Fig. 4. Intraoral right initial picture.

Fig. 5. Intraoral central initial picture.

Fig. 6. Intraoral left initial picture.

Fig. 7. Intraoral upper occlusal initial picture.

Fig. 8. Intraoral lower occlusal initial picture.

Fig. 9. Initial orthopantomography.

Fig. 10. Initial lateral x-ray.

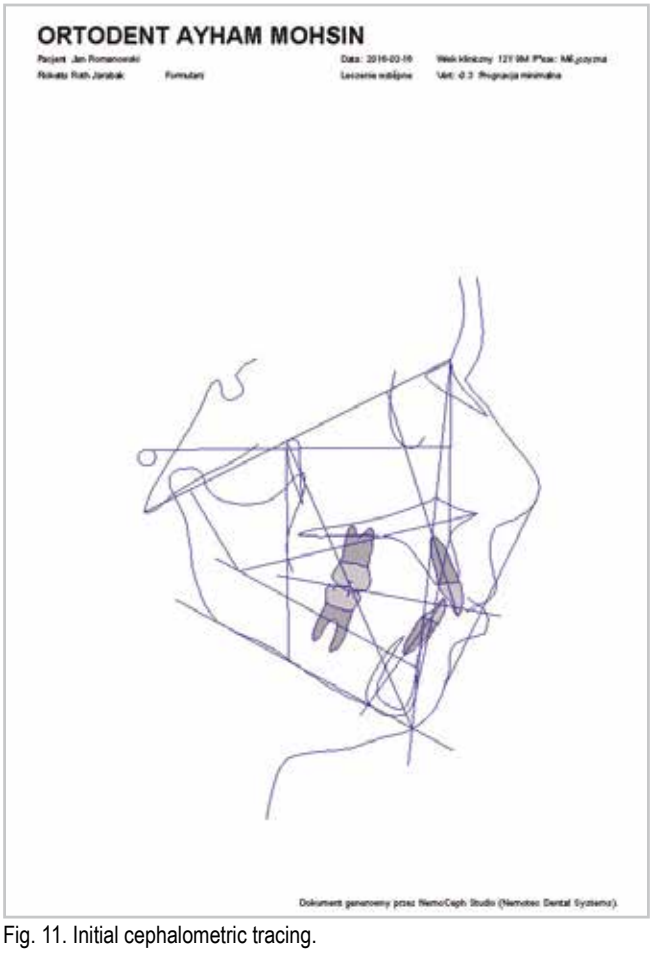


Fig. 11. Initial cephalometric tracing.

ORTODENT AYHAM MOHSIN

Pacjent Jan Romanowski Pïeæe: Mê¿czyzna Wiek kliniczny: 12Y 9M
Formularz Data: 2016-02-16

Ricketts Roth Jarabak

Dental and esthetic problem					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle	Klasa
Molar Relation (A6-B6)	1.3	-3.0 ± 3.0	4.3	x	Clase II Dental
Lip Protrusion (LL-PnPog')	2.9	-2.8 ± 2.0	5.7	xx	Protusión Labial
Canine Relation (A3-B3)	1.8	-2.0 ± 3.0	3.8	x	Clase II Dental
Lower Incisor Protrusion (B1-APog)	2.3	1.0 ± 2.3	1.3		Normal
Overjet (B1-A1 Horz.)	5.3	2.5 ± 2.5	2.8	x	
Upper Incisor Protrusion (A1-APog)	7.8	3.5 ± 2.3	4.3	x	Protrusión
Lip Embrasure-Occlusal Plane	-2.5	-3.1 ± 2.0	0.6		Normoposición
Overbite (B1-A1 Vert.)	4.7	2.5 ± 2.5	2.2		Normal
Lower Incisor Inclination	23.7	22.0 ± 4.0	1.7		Normal
Lower Incisor Extrusion (B1-Occl.)	2.3	1.3 ± 2.0	1.1		Normal
Upper Incisor Inclination	29.7	28.0 ± 4.0	1.7		Normal
Interincisal Angle (A1 - B1 angle)	126.6	132.0 ± 6.0	-5.4		Normal
Occlusal Plane Inclination	18.3	23.9 ± 4.0	-5.6	-x	

Skeletal Problem					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle	Klasa
Convexity (A-NPog)	5.5	1.3 ± 2.0	4.3	xx	
Jaw Relationship NL/ML	36.1	25.0 ± 6.0	11.1	x	
Facial Depht Angle (PoOr-NPog)	83.6	88.2 ± 3.0	-4.6	-x	DólicoFacial
Facial Axis (BaN-PTGn)	87.0	90.0 ± 3.0	-3.0	-x	DólicoFacial
Gonial Angle	133.5	130.0 ± 7.0	3.5		MesoFacial
Mandibular Plane Angle (GocMe-PoO	29.0	24.9 ± 4.0	4.1	x	DólicoFacial
Maxillary Depth (PoOr-NA)	89.3	90.0 ± 3.0	-0.7		Normal

VERT					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle	Klasa
Facial Axis	87.0	90.0 ± 3.0	-3.0	-x	DólicoFacial
Facial Depth	83.6	88.2 ± 3.0	-4.6	-x	DólicoFacial
Mandibular Plane Angle	29.0	24.9 ± 4.0	4.1	x	DólicoFacial
Lower Facial Height	42.1	47.0 ± 4.0	-4.9	-x	BraquiFacial
Mandibular Arch	30.6	27.9 ± 4.0	2.8		MesoFacial

Growth					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle	Klasa
Saddle/Sella Angle	126.2	122.0 ± 5.0	4.2		Clase I Osea
Articular Angle	136.6	143.0 ± 6.0	-6.4	-x	BraquiFacial
Gonial Angle	133.5	130.0 ± 7.0	3.5		MesoFacial
Sum 1-2-3	396.2	396.0 ± 6.0	0.2		MesoFacial
Upper gonial angle	58.5	53.5 ± 1.5	5.0	xxx	BraquiFacial
Lower gonial angle	75.0	72.5 ± 2.5	2.5	x	DólicoFacial
Posterior Craneal Base Length	37.3	33.9 ± 3.0	3.4	x	DólicoFacial
Ramus Height	39.8	47.8 ± 5.0	-8.0	-x	DólicoFacial
Anterior Craneal Base Length	69.5	74.8 ± 3.0	-5.2	-x	Hipoplasia
Mandibular Body Length	59.4	75.1 ± 5.0	-15.8	-xxx	Retrognatismo Mandibular
Posterior Facial Height	71.6	77.5 ± 7.5	-5.9		MesoFacial
Anterior Facial Height	111.5	112.5 ± 7.5	-1.0		MesoFacial
Post.Fac.H / Ant.Fac.H	64.2	63.5 ± 1.5	0.7		MesoFacial

Dokument generowny przez NemoCeph Studio (Nemoteo Dental Systems).

Fig. 12. Initial cephalometric values.

Fig. 13. Initial right pictures of the study models

Fig. 14. Initial central picture of the study models.

Fig. 15. Initial left picture of the study models.

Fig. 16. Initial upper occlusal picture of the study models.

Fig. 17. Initial lower occlusal picture of the study models.

The treatment plan was orthodontic treatment without extractions but, at the end of the treatment, it is necessary to evaluate the necessity of the extraction of the third molars. It is necessary the transpalatal bar and the Twin Force to advance the mandible. Brackets Roth .018" were used with bands in the upper first molars and a transpalatal bar (TPB).

Fig. 18. Upper bonding with .016" CuNiTi archwire and the TPB. Right picture.

Fig. 19. Upper bonding with .016" CuNiTi archwire and the TPB. Central picture.

Fig. 20. Upper bonding with .016" CuNiTi archwire and the TPB. Left picture.

Fig. 21. Upper bonding with .016" CuNiTi archwire and the TPB. Upper occlusal picture.

Fig. 22. Upper archwire .014" x .025" Thermal NiTi and lower arch, bonding of .018" Roth brackets with an archwire .016 Thermal NiTi, and posterior build-ups on 16,14,24,26 because of the increassed overjet. Right picture.

Fig. 23. Upper archwire .014" x .025" Thermal NiTi and lower arch, bonding of .018" Roth brackets with an archwire .016 Thermal NiTi, and posterior build-ups on 16,14,24,26 because of the increassed overjet. Central picture.

Fig. 24. Upper archwire .014" x .025" Thermal NiTi and lower arch, bonding of .018" Roth brackets with an archwire .016 Thermal NiTi, and posterior build-ups on 16,14,24,26 because of the increassed overjet. Left picture.

Fig. 25. Upper archwire .014" x .025" Thermal NiTi and lower arch, bonding of .018" Roth brackets with an archwire .016 Thermal NiTi, and posterior build-ups on 16,14,24,26 because of the increassed overjet. Upper occlusal picture.

Fig. 26. Upper archwire .014" x .025" Thermal NiTi and lower arch, bonding of .018" Roth brackets with an archwire .016 Thermal NiTi, and posterior build-ups on 16,14,24,26 because of the increassed overjet. Lower occlusal picture.

The treatment continuous with an upper arch .017" x .025" Stainless Steel with omegas and compensation curvatures, „8" figure ligature to ferulize the teeth 13,12,11 and elastic chain from 11 to 21 to close the distema to the midline. Lower archwire was .016" x .022 SS-2 with curvatures, 8-figure ligature 33,32,31,41 and elastic chain from 41 to 42 for the same purpose.

After it, upper and lower archwires .017" x .025" Stainless Steel with omegas distal to first molars and the indication of light class II elastics (2,5 ounces) for muscular adaptation during a month.

After it, the Twin Force appliance was mounted.

Fig. 27. Upper and lower .017" x .025" stainless steel archwires and Twin Force. Right picture.

Fig. 28. Upper and lower .017" x .025" stainless steel archwires and Twin Force. Central picture.

Fig. 29. Upper and lower .017" x .025" stainless steel archwires and Twin Force. Central picture, open mouth.

Fig. 30. Upper and lower .017" x .025" stainless steel archwires and Twin Force. Left picture.

The patient use the Twin Force for 3 months.

Fig. 31. Same archwires and elastics to improve the midline. Right picture.

Fig. 32. Same archwires and elastics to improve the midline. Central picture.

Fig. 33. Same archwires and elastics to improve the midline. Central picture, open mouth.

Fig. 34. Same archwires and elastics to improve the midline. Left picture.

Fig. 35. Same archwires without elastics to check the estability and detailing. Right picture.

Fig. 36. Same archwires without elastics to check the estability and detailing. Central picture.

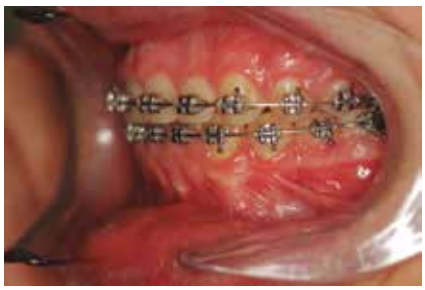


Fig. 37. Same archwires without elastics to check the estability and detailing. Left picture.

Final results improving the occlusion and the profile are in the following picture. Total treatment time was 20 months. The extraction of the third molars was indicated. Retention period was indicated.

Fig. 38. Facial frontal final picture.

Fig. 39. Facial frontal “smiling” final picture.

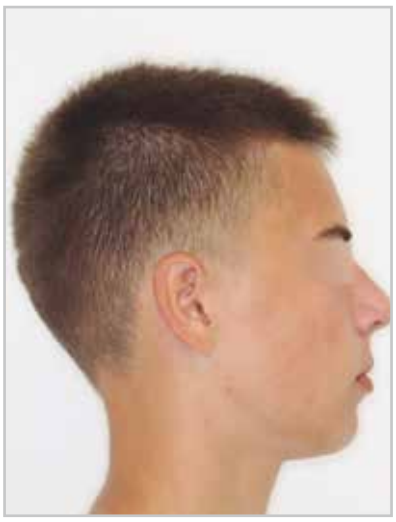


Fig. 40. Facial profile final picture.

Fig. 41. Intraoral right final picture.

Fig. 42. Intraoral central final picture.

Fig. 43. Intraoral left final picture.

Fig. 44. Intraoral upper occlusal final picture.

Fig. 45. Intraoral lower occlusal final picture.

Fig. 46. Final orthopantomography.

Fig. 47. Final lateral x-ray.

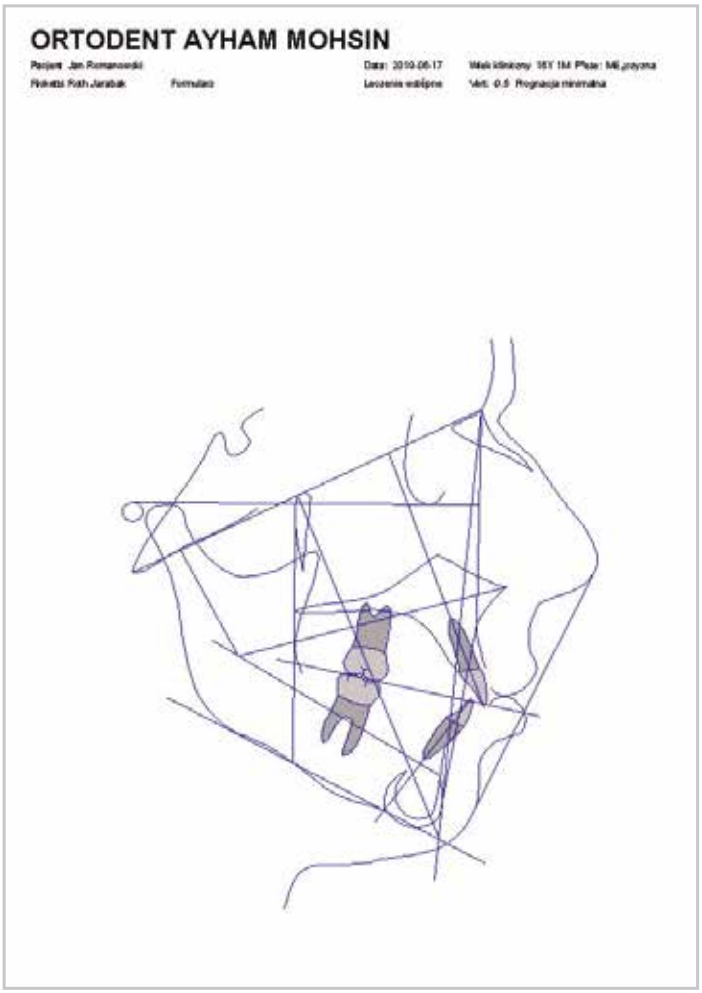


Fig. 48. Final cephalometric tracing.

ORTODENT AYHAM MOHSIN

Pacjent Jan Romanowski Płeæ: Mê¿czyzna Wiek kliniczny: 16Y 1M
Formularz Data: 2019-06-17

Ricketts Roth Jarabak

Dental and esthetic problem					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle†	Klasa
Molar Relation (A6-B6)	0.5	-3.0 ± 3.0	3.5	x	Clase II Dental
Lip Protrusion (LL-PnPog')	1.4	-3.4 ± 2.0	4.9	xx	Protusión Labial
Canine Relation (A3-B3)	2.0	-2.0 ± 3.0	4.0	x	Clase II Dental
Lower Incisor Protrusion (B1-APog)	2.4	1.0 ± 2.3	1.4		Normal
Overjet (B1-A1 Horz.)	3.9	2.5 ± 2.5	1.4		Normal
Upper Incisor Protrusion (A1-APog)	6.3	3.5 ± 2.3	2.8	x	Protrusión
Lip Embrasure-Occlusal Plane	-3.5	-2.8 ± 2.0	-0.7		Normoposición
Overbite (B1-A1 Vert.)	1.2	2.5 ± 2.5	-1.3		Normal
Lower Incisor Inclination	27.3	22.0 ± 4.0	5.3	x	Labial
Lower Incisor Extrusion (B1-Occl.)	0.6	1.3 ± 2.0	-0.6		Normal
Upper Incisor Inclination	31.4	28.0 ± 4.0	3.4		Normal
Interincisal Angle (A1 - B1 angle)	121.3	132.0 ± 6.0	-10.7	-x	
Occlusal Plane Inclination	18.5	25.5 ± 4.0	-7.1	-x	

Skeletal Problem					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle†	Klasa
Convexity (A-NPog)	4.9	0.6 ± 2.0	4.3	xx	
Jaw Relationship NL/ML	34.1	25.0 ± 6.0	9.1	x	
Facial Depht Angle (PoOr-NPog)	84.6	89.3 ± 3.0	-4.7	-x	DólicoFacial
Facial Axis (BaN-PTGn)	87.4	90.0 ± 3.0	-2.6		MesoFacial
Gonial Angle	131.5	130.0 ± 7.0	1.5		MesoFacial
Mandibular Plane Angle (GocMe-PoO	27.2	23.9 ± 4.0	3.3		MesoFacial
Maxillary Depth (PoOr-NA)	89.2	90.0 ± 3.0	-0.8		Normal

VERT					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle†	Klasa
Facial Axis	87.4	90.0 ± 3.0	-2.6		MesoFacial
Facial Depth	84.6	89.3 ± 3.0	-4.7	-x	DólicoFacial
Mandibular Plane Angle	27.2	23.9 ± 4.0	3.3		MesoFacial
Lower Facial Height	45.2	47.0 ± 4.0	-1.8		MesoFacial
Mandibular Arch	30.1	29.5 ± 4.0	0.5		MesoFacial

Growth					
Pomiar	Wartoœæ	Œrednia	Ró¿nica	Odchyle†	Klasa
Saddle/Sella Angle	129.3	122.0 ± 5.0	7.3	x	
Articular Angle	134.4	143.0 ± 6.0	-8.6	-x	BraquiFacial
Gonial Angle	131.5	130.0 ± 7.0	1.5		MesoFacial
Sum 1-2-3	395.2	396.0 ± 6.0	-0.8		MesoFacial
Upper gonial angle	56.3	53.5 ± 1.5	2.8	x	BraquiFacial
Lower gonial angle	75.2	72.5 ± 2.5	2.7	x	DólicoFacial
Posterior Craneal Base Length	38.6	35.5 ± 3.0	3.1	x	DólicoFacial
Ramus Height	46.0	51.1 ± 5.0	-5.1	-x	DólicoFacial
Anterior Craneal Base Length	70.7	78.1 ± 3.0	-7.4	-xx	Hipoplasia
Mandibular Body Length	59.0	78.8 ± 5.0	-19.8	-xxx	Retrognatismo Mandibular
Posterior Facial Height	78.0	77.5 ± 7.5	0.5		MesoFacial
Anterior Facial Height	117.3	112.5 ± 7.5	4.8		MesoFacial
Post.Fac.H / Ant.Fac.H	66.5	63.5 ± 1.5	3.0	xx	BraquiFacial

Dokument generowny przez NemoCeph Studio (Nemotec Dental Systems)

Fig. 49. Final cephalometric values.

Case report with CA© Clear Aligner technique and after periodontal and prosthetic treatment

Dr. Víctor Orozco
Professor Master of Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute and San Jorge University.

Summary

Patient of 42 years old that present class I malocclusion with severe crowding in lower arch, pro-inclination of upper lateral incisors, not levelled upper and lower incisors, anterior deep bite. Prosthetic crowns in 11, 13, 14, 15, 16, 23, 24, 25 y 26.

Fig. 1. Initial intraoral right photograph.

Fig. 2. Initial intraoral central photograph.

Fig. 3. Initial intraoral left photograph.

Fig. 4. Initial intraoral upper occlusal photograph.

Fig. 5. Initial intraoral lower occlusal photograph.

TREATMENT PLAN:

Treatment with CA Clear Aligner of 8 steps in the upper arch and expansion and 12 steps in the lower arch with expansion and stripping.

EVOLUTION OF THE TREATMENT:

Figs. 6-10 shows the initial expansion with CA Clear Aligner with CA Vector Screw 45 in the lower arch.

Figs. 11-15. It is observed the progress in the alignment in both arches, with the digital progressive set ups.

Figs. 16-20. It is observed the intrussion of the upper incisors and the bonding of the CA Power Grip 5 (FALI) on the palatal Surface of 12 and 22, to active the labial root torque of these teeth.

Figs. 21-25. It is observed the CA Clear Aligner Forced Intrussion for the upper right central incisor.

Figs. 26-30 without aligners and Figs. 31-35 with aligners, it is observed the progress of the intrussion of the 11, correction of the torque of 12 and 22, alignment and intrusion of the lower incisors.

Figs. 31-35, it is observed the final refinament of the upper and lower teeth.

Figs. 36-40, it is observed the final of the orthodontic treatment, ready for the aesthetic/prosthetic treatment.

Figs. 41-45, after the periodontic and esthetic treatment.

Patient in mixed dentition treated in a 1st phase that will be treated in a 2nd phase with fixed appliancest

Dr. Víctor Orozco
Professor Master of Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute and Universidad San Jorge.

Summary

9 years old patient, in mixed dentition, that has molar class I, skeletal class I and mesofacial patern. She has unilateral posterior cross bite with lower midline deviation to the cross bite side. This situation makes us to suspect that the patient has functional cross bite provoked by a narrow symmetrical palate. The diagnosis was done with the patient in centric relationship to confirm that the patient has functional cross bite.

Fig. 1. Initial extraoral frontal picture.

Fig. 2. Initial extraoral frontal picture smiling.

Fig. 3. Initial extraoral profile picture.

Fig. 4. Initial extraoral profile picture smiling.

Fig. 5. Initial ¾ extraoral picture.

Fig. 6. Initial ¾ extraoral picture smiling.

Fig. 7. Initial intraoral right picture.

Fig. 8. Initial intraoral frontal picture.

Fig. 9. Initial intraoral left picture.

Fig. 10. Initial intraoral upper occlusal picture.

Fig. 11. Initial intraoral lower occlusal picture.

Figu. 12. Ortopantomography.

Fig. 13. Lateral X-ray.

TREATMENT PLAN

Orthopedic separation was carried out with modified McNamara-Alpern separator.

Fig. 14. Intraoral right picture with separator.

Fig. 15. Intraoral frontal picture with separator.

Fig. 16. Intraoral left picture with separator.

Fig. 17. Intraoral upper occlusal picture with separator

Fig. 18. Intraoral lower occlusal picture.

Patient has unilateral posterior cross bite of 7 mm. Thus, it is needed an expansion of 3,5 mm per each side with mandibular centering, that it is produced by the deprogramming of the mandibule in the centric relationship position due to the “splint” effect of the separator.

The separator was activated 2/4 turns every day during the first week, allowing a total expansión of 3,5 mm. The following week it was activated ¼ turns per day, allowing an expansion of 1,7 mm more. In that way, it is possible to get overcorrection of molar overjet of 1,5mm approximately per each side.

Fig. 19. Intraoral right picture after separation.

Fig. 20. Intraoral frontal picture after separation.

Fig. 21. Intraoral left picture after separation.

Fig. 22. Intraoral upper occlusal picture adter separation.

Fig. 23. Intraoral lower occlusal picture.

Once the unilateral posterior cross bite was corrected, the retention phase starts. Normally, the retention phase is carried out with an active plate, but parents of the patient preferred fixed retention. That's why molar bands with a transpalatal bar (TPB) were bonded during 6 months.

Fig. 24. Intraoral right picture with TPB.

Fig. 25. Intraoral frontal picture with TPB.

Fig. 26. Intraoral left picture with TPB.

Fig. 27. Intraoral upper occlusal picture with TPB.

Fig. 28. Intraoral lower occlusal picture.

Fig. 29. Intraoral left picture after removing TPB.

Fig. 30. Intraoral frontal picture after removing TPB.

Fig. 31. Intraoral left picture after removing TPB.

Fig. 32. Intraoral upper occlusal picture after removing TPB.

Fig. 33. Intraoral lower occlusal picture.

When the patient will complete the eruption of permanent dentition, a new orthodontic study will be carried out in order to value the necessity of a 2nd phase treatment with fixed appliances..

Case Report. The use of reverse chin cup for skeletal class III treatment

Pablo Echarri
Director of the Master in Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute and San Jorge University.

Miguel Ángel Pérez Campoy
Coordinator of the Master in Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute and San Jorge University.

Javier Echarri
Professor of the Master in Orthodontics and Dentofacial Orthopedics of Athenea Dental Institute and San Jorge University.

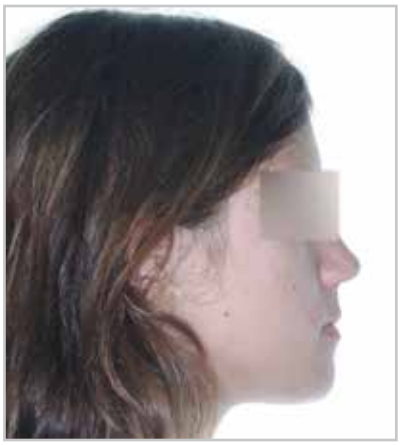
Diagnosis

Patient of 17 years old with molar class III, no crowding, midline deviation, skeletal class III, maxillary retrognathia and mandibular prognathism, functional deviation of the chin, presence of the third molars. The patient is still growing.

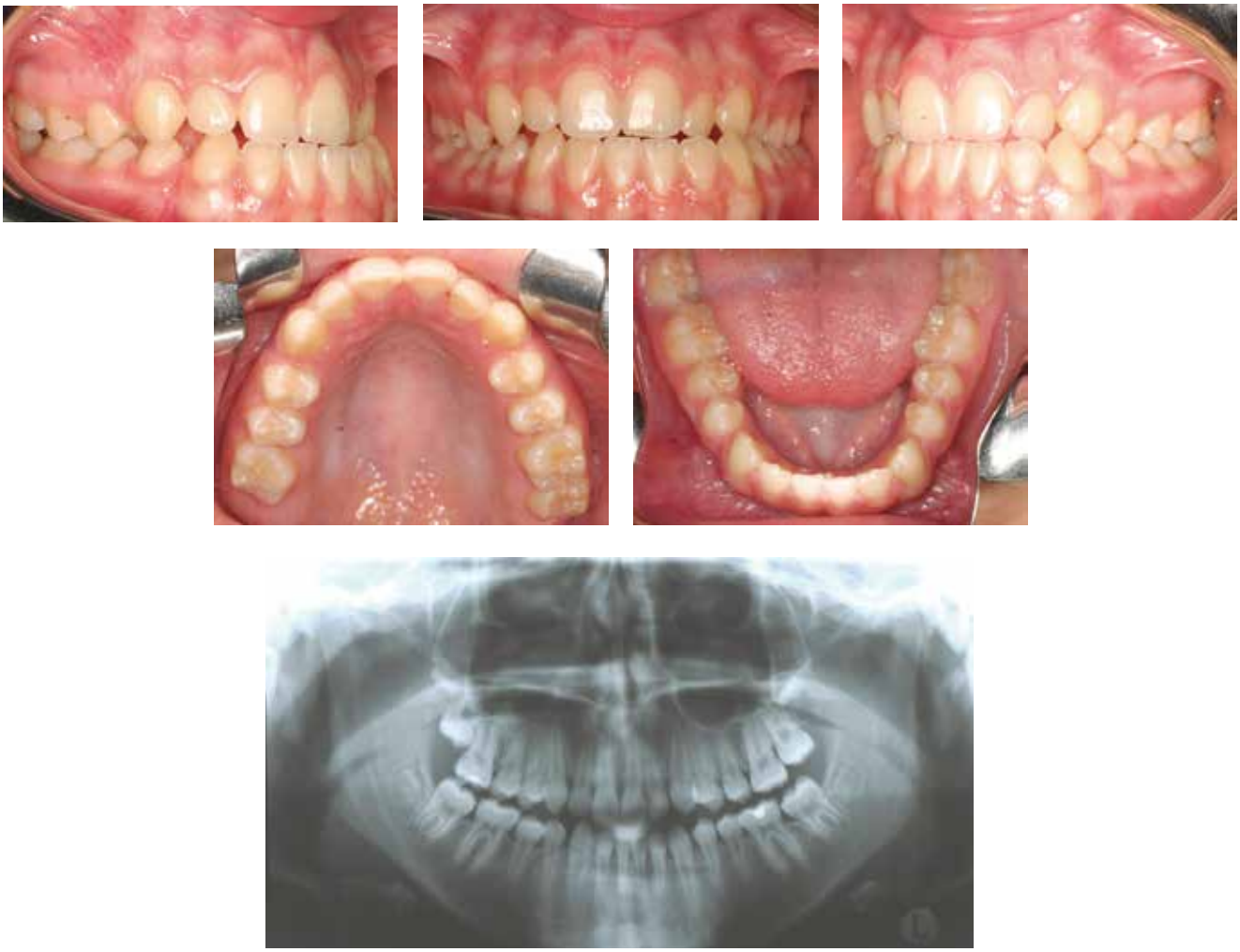
Treatment

Treatment with fixed appliances without extractions. Anterior traction of the upper arch to the reverse chin cup and distalization of the lower arch with microimplants after the germectomy of the lower third molars.

It is indicated mentoplasty when the patient finished the treatment. It is indicated the inhibition of the mandibular growing and



Figs 1a - c. Initial records.



Figs 1d - k. Initial records.

Figs 1l. Initial records.

the stimulation of the forward maxillary growing with the reverse chin cup. (in the chin cup, it was indicated 18 ounces and for the anterior traction, 6 ounces) (fig. 2).

Figs 2a and b – Reverse chin cup.

Fig. 3a - c. Bonding of the upper brackets and alignment and levelling with .016" NiTi archwire.

Fig. 3d. Bonding of the upper brackets and alignment and levelling with .016" NiTi archwire.

Fig. 4a - e. Torque stablishing of the upper arch with 16x22 NiTi archwire.

Fig. 5a - e. Bonding of the lower brackets and alignment and levelling with .016" NiTi archwire.

Fig. 6. Upper arch 16x22 SS with omega loops and lower arch 16x22 NiTi.

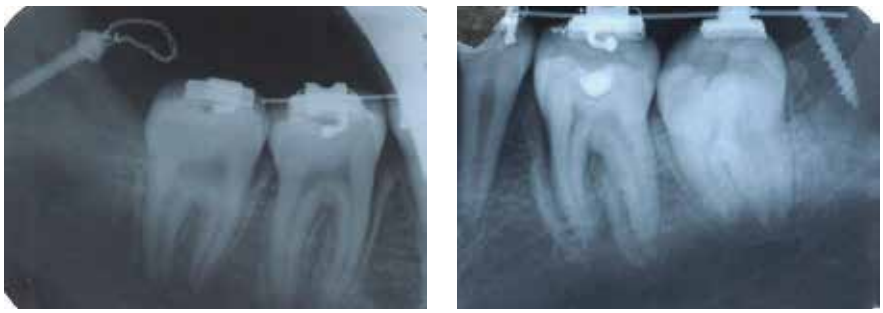
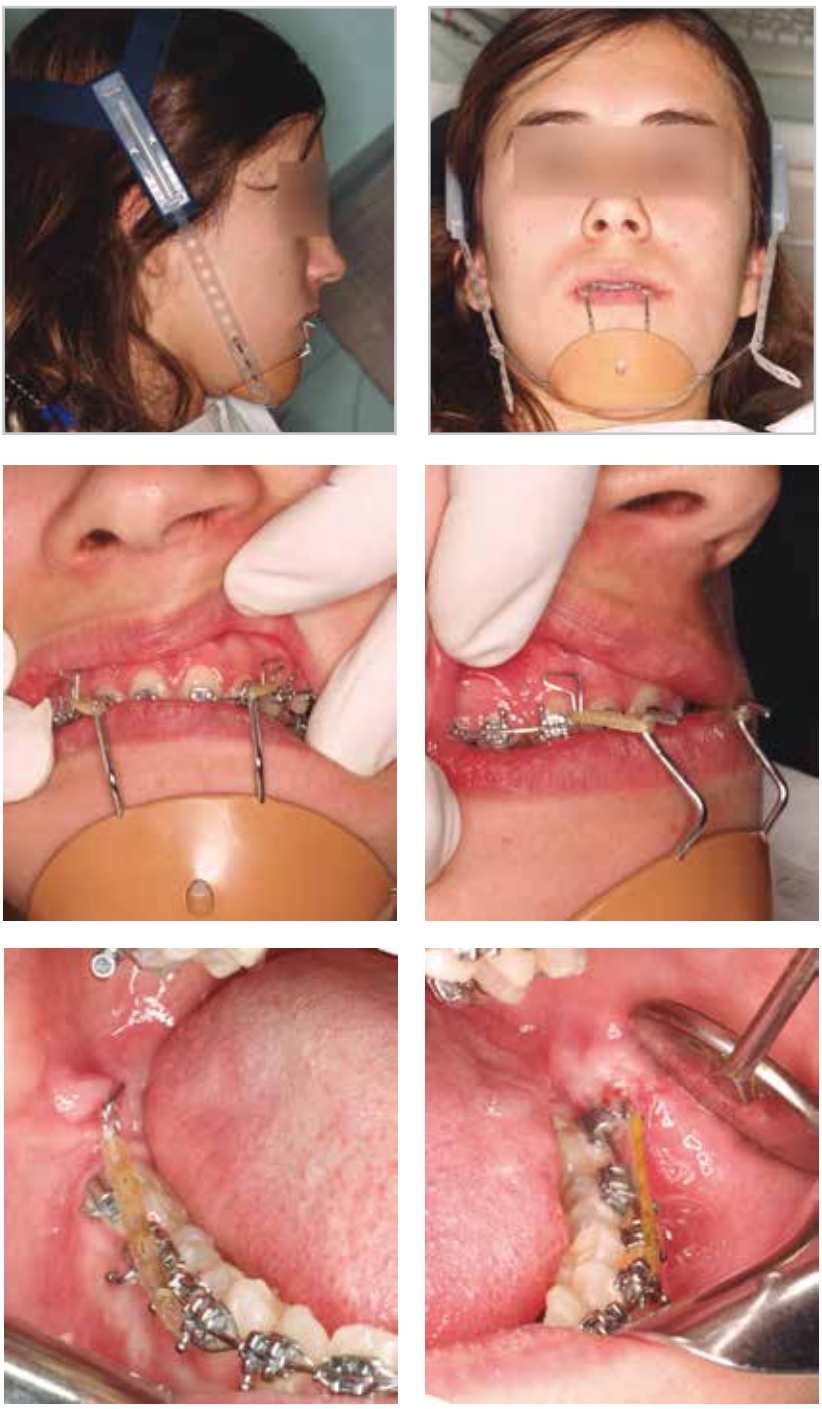


Fig. 7. Extraction of lower third molar and insertion of the microimplants. Upper anterior traction with 16x22 upper SS archwire with “L” and omega loops from the reverse chin cup. Distalization of the lower arch with traction from the microimplants. There is applied asymmetrical forces for the anterior traction and the lower distalization to center the midline. The direction of the forces for the anterior traction is forward and downward.

Figs 8a - d. Upper anterior traction with 16x22 upper SS archwire with “L” and omega loops from the reverse chin cup. Distalization of the lower arch with traction from themicroimplants.



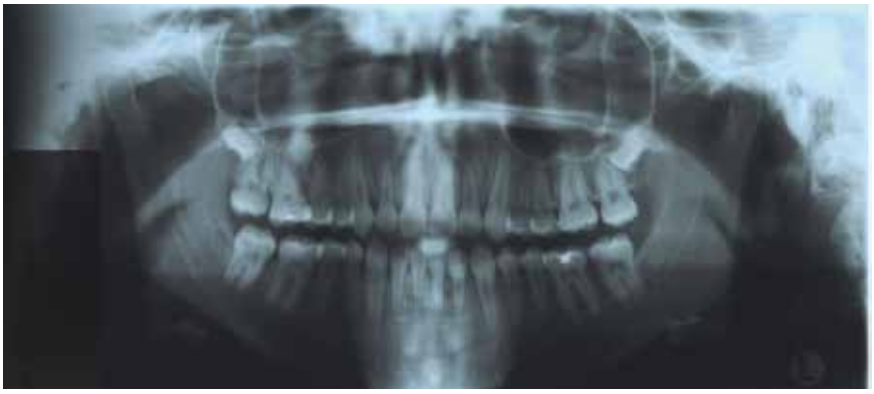
Figs 8e - j. Upper anterior traction with 16x22 upper SS archwire with “L” and omega loops from the reverse chin cup. Distalization of the lower arch with traction from themicroimplants.

Figs 9a - e. Evolution of the treatment 1.

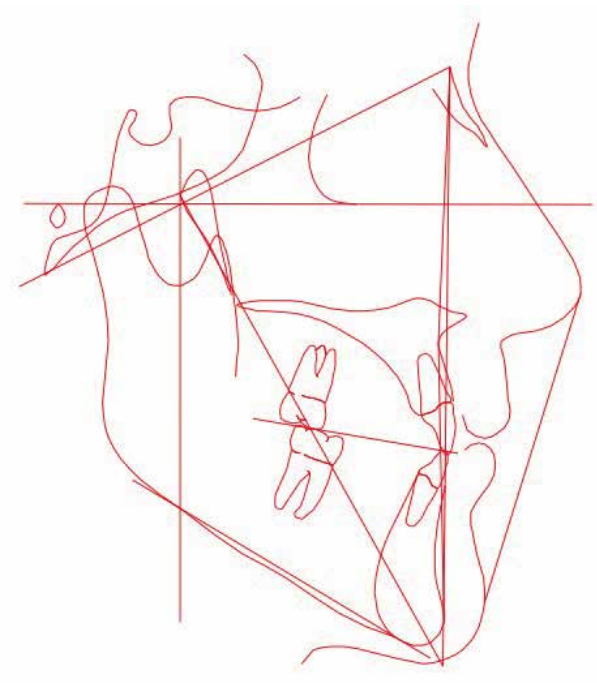
Figs 10a - e. Evolution of the treatment 2.

Figs 11a - e. Evolution of the treatment 3.

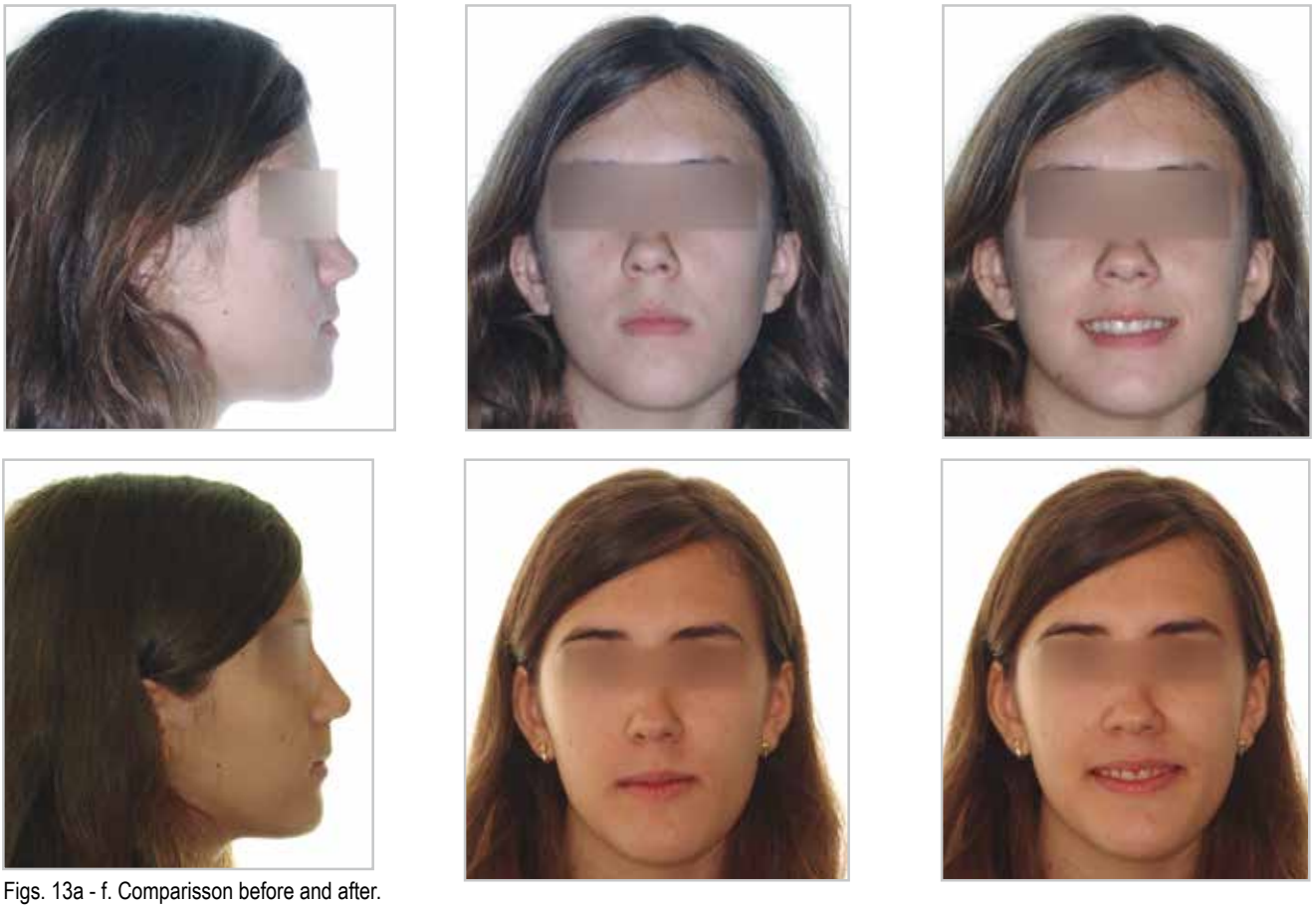
Figs 11f. Evolution of the treatment 3.



Figus 12a - i. Final results

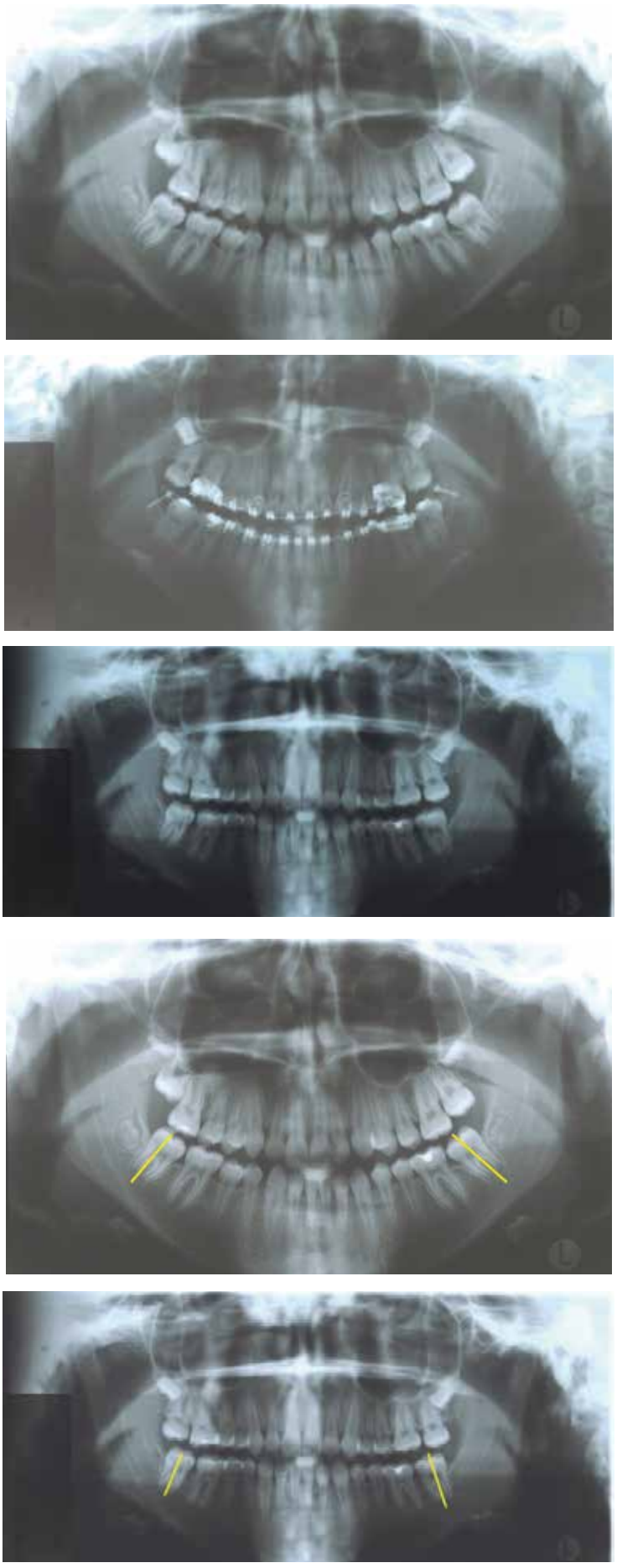


Figus 12j and k. Final results



Figs. 13a - f. Comparisson before and after.

Figs. 13g - o. Comparisson before and after.



Figs. 13p - t. Comparisson before and after.

Figs. 14a - h. Control 1 years later.

Figs. 15a - f. Control 2 years later.

Figs. 15g y h. Control 2 years later.

ATHENEA
DENTAL INSTITUTE

SPAIN
Training center: c/ Lleó 13. 1ª Planta
08911 Barcelona. España
Clinic and technical classroom:
c/ Cartagena 248-256. Local 5
08025 Barcelona. España
93 513 74 81
info@atheneainstitute.com
www.atheneainstitute.com

POLAND
Rejtana 9, 35-326 Rzeszów. Poland
666 091 708
kasia@atheneainstitute.com
www.atheneainstitute.com