



Angle Society of Europe

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Going, Austria

Abstracts

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Anne Marie Kuijpers Jagtman

Orthodontics: prospects for a bright / dark future (delete as applicable)

Significant progress has been made in the development of materials and techniques allowing us to spend less chair time per patient than ever before. Surgical techniques have developed enormously, enabling the management of severe skeletal problems that are beyond our wildest dreams. However many of the core problems in daily practice that confused us decades ago are still with us today! Progress in the field of orthodontics seems to be equivalent to technical development, while advances in related fields and basic sciences are not routinely integrated into clinical practice. Furthermore for many orthodontic procedures evidence is not available, leaving the clinician frustrated how to proceed in the absence of evidence. On the other hand, the tragedy of the scarce evidence is that many orthodontists perceive it as a threat to their current methods and techniques. Is there a way out?

Lysle Johnston

Through a Glass Darkly: Orthodontics in the 21st Century

“Major Strasser has been shot! Round up the usual suspects.” This famous line from Casablanca seems to express perfectly the cynicism and moral ambiguity of life in an occupied country at war. Strangely enough, it resonates a half century later in what often seems to be an equally cynical world of orthodontic “science.” Instead of “usual suspects,” we have immortal, but soluble, controversies whose resolution seems to be irrelevant to the orderly flow of commerce. After all, nobody dies from anchorage loss. And people wonder why we face a shortage of dedicated academics! I will argue that, unless we are careful, orthodontics will cease to be a learned dental specialty and, instead, will become a lesser calling in which the uncritical sell the unlikely to the unknowing.

The truth about TADs

The primary intention of this study was to add to the body of scientific evidence by determining whether a recently introduced method of anchorage reinforcement, namely Temporary Anchorage Devices (TADs), is effective. It is clear that there are several commonly used methods for anchorage support but some of these are totally dependent for success upon good patient compliance. Orthodontic clinicians would enthusiastically welcome as an alternative, an effective and efficient method that is less dependent upon patient co-operation.

The introduction of new orthodontic techniques is rarely supported by high quality evidence on efficiency or effectiveness, in advance of them being promoted for widespread clinical use. New appliances and techniques are often promoted based upon very low levels of clinical evidence. Temporary Anchorage Devices (TADs) were first introduced in 1983. Since then many papers have referred to TADs as a source of stationary anchorage yet to date, few Randomised Clinical Trials (RCTs) have been carried out into this treatment method.

Aims To evaluate the effectiveness of Temporary Anchorage Devices for orthodontic anchorage when compared with the Nance button palatal arch and to Headgear

Methods The TADs assessment trial is a prospective, dual-centre RCT involving 78 'maximum anchorage' patients between 12 and 18 years of age with 39 males and 39 females. The three treatment arms of the study were Headgear, a Nance button palatal arch and TADs. Outcomes recorded included: anchorage loss measured both on lateral cephalometric radiographs and 3D model scanning, length of treatment, number of visits, quality of the outcome and the patients' perception of the various treatment methods.

Results Sample summary statistics showed the groups to be matched in terms of age, start PAR score and SNA. There was a statistically significant ($p=0.002$) overall effect of treatment when the right molar position was assessed on cephalograms. The Nance group lost 2.03mm (0.81-3.25) more anchorage than the Headgear group. No other statistically and clinically significant results were recorded between the groups on the cephalograms or on the superimposed digital models. Treatment times with all three groups averaged out between 26.83 (SD 9.35) and 28.01(SD 5.38) months and the total number of visits from 18.38 (SD 5.95) and 21.77 (SD 4.41). Casual visits and DNAs were almost identical between the groups but PAR scores were nearly 4 points better with TADs than Headgear and Nance. This result was statistically and clinically significant. From the patient questionnaires, the comfort levels both on placement and removal were similar with TADs and the Nance, and both techniques were highly recommended by the patients. Headgear was more troublesome and much less popular with the patients.

Conclusions

- 1) There is no difference in the effectiveness of temporary anchorage devices, Nance button palatal arches and headgear in reinforcing anchorage in orthodontic treatment.
- 2) Patient's perception suggest that there were greater problems with headgear and Nance buttons, than with temporary anchorage devices.
- 3) The quality of treatment as measured by PAR scores was significantly better with TADs than with headgear
- 4) Temporary anchorage devices may be the preferred method of choice for reinforcing orthodontic anchorage

Björn Ludwig

Essay

10 facts about Non-Compliance Space Closure in Patients with Missing Maxillary Laterals

Introduction

Unilateral space closure is a difficult problem in orthodontics. Especially asymmetrical space closure without reactive loss of anchorage in the anterior dental arch seemed to be easily achievable since the advent of skeletal anchorage techniques.

Aim

After the early enthusiasm about such techniques frustration mostly because of high failure rates of interradicular miniscrews and in-efficient biomechanics appeared. The question was: How effective is skeletal supported unilateral space closure in our office compared with the current literature?

Material

We retrospectively analysed all our skeletal supported unilateral space closures and looked at different aspects like, the kind of skeletal anchorage (MIs or miniplates) , failure rates of the anchorage devices, the applied biomechanics (double pull, T-Loops, etc.), bone management (corticotomy, hemisection, etc.), space closure speed, side effects of the treatment and the most common appearing problems during treatment. Also a systematic literature review around this topic was performed.

Results

Beside presenting the results the major drawbacks and problems will be demonstrated on several clinical cases. Finally a proposal for a clinical prognosis score will be presented according to this retrospective cohort study and the systematic literature review.

Mechanical properties of lingual fixed retainers: interactions between wires and composites

Introduction

In daily clinical practice retention is very important and lingual retainers are part of this challenge. Lingual retainers failures could be due to many factors.

Aim

The aim of this study was to assess the mechanical behaviour between four different types of wires and three different composites in lingual retainers.

Material

Each wire was pre-silaned and then bonded with each of the composites and a traction test using an instron machine measured the maximum loading force that caused complete detachment of the interface for each of the 12 specimens. The maximum loading tension for each specimen was then calculated.

Results

The results showed that the bonding between wires and composites in lingual fixed retainers seems to be the lowest in the rectangular wires and increases in round twist and rectangular twist wires where the bonding is so high that shows a maximum loading tension/bond strength which overcomes the fractural nominal loading of the wire. These conditions have the highest values in rectangular twist wires.

Concerning the composites, hybrid composites have the lowest interface bonding values and break very quickly, while the nano and micro composites tolerate stronger forces and show higher bonding values. The nano filled composites have the highest maximum loading tensions. The best combination is a twisted wire with a nano composite. The maximum possible values in the best matching conditions do not exceed 36,7 MPa.

The results of this study show that, when selecting a lingual retainer in daily clinical practice, not only the patient's compliance & reliability must be considered but also the combination of different composites and wires in terms of mechanical properties and composition.

Andrew Dibiase

Guest lecture

Malocclusion, orthodontics and bullying

Bullying is endemic within most education systems and can have profound, devastating and long-term effects. There are many factors that make a child more susceptible to being bullied and there is some anecdotal evidence that this includes the presence of a malocclusion. Being bullied can therefore be a reason to seek orthodontic treatment. However the question remains, as orthodontists can we help these unfortunate individuals?

This presentation will report on a cross sectional study carried out in the UK that investigates whether there are certain occlusal traits that make individuals more susceptible to bullying and how this impacts on their oral related quality of life and self-esteem. From this study the patients that were identified as being bullied were subsequently followed up and the effects of orthodontic intervention were assessed and these will also be presented.

Alexander Dudic

Guest lecture

Pain discomfort induced by orthodontic tooth movement

Pain associated with dental care, is a subjective reaction strongly influenced by factors such as gender, personality, and, especially, previous general and dental experience. In the last decades, several studies have focused on the composition of gingival crevicular fluid (GCF) and the changes that occur during orthodontic tooth movement.

The objective of the present investigation was to study the experience of pain after placement of orthodontic elastic separators and the possible associations with the gingival crevicular fluid (GCF) composition changes.

In 18 children (mean age 10.8 yrs) molar elastic separators were inserted mesially to 2 first upper molars. One of the antagonist molars served as control. The GCF was collected from each molar, before (day -7, day 0) and after the placement of separators (1 h, day 1, and day 7). Pain intensity was recorded using a visual analog scale (VAS). The contents of interleukin 1-beta (IL-1 β), substance P (SP), and prostaglandin-E2 (PGE2) were determined by enzyme-linked immunosorbent assay.

Pain intensity increased after 1 h and remained high on day 1. On day 7, no significant pain was reported. After 1 h, 1 day, and 7 days, mean GCF IL-1 β levels were significantly elevated at treatment teeth compared to control teeth (highest day 1). The GCF levels of SP and PGE2 for the treatment teeth were significantly higher at day 1 and day 7 than the control teeth. All 3 mediators remained at baseline levels throughout the experiment for the control teeth. The intensity of pain at 1 h was associated to PGE2 levels ($R^2 = 0.38$; $P < .05$), whereas at day 1, the intensity of pain was associated to IL-1 β levels ($R^2 = 0.63$, $P < .0001$). Thus, we report a rapid release of biochemical markers (1 h) that peaked after 1 day and partially decreased 7 days later. The intensity of pain followed a similar pattern. Associations were found between the experience of pain intensity and the GCF mediator levels.

Perspective: The study may help to detect, in an initial stage, individuals prone to perceive higher level of pain during orthodontic treatment. This may help in the development of methods that will better control and/or alleviate the discomfort of pain during tooth movement.

Stéphane Barthelemi

Guest lecture

Components of overbite correction in lingual orthodontics: Molar extrusion or Incisor intrusion?

Objective

The aim of this study was to evaluate the components of overbite correction with lingual Incognito Technique®

Materials and Methods

The study was based on 45 files of patients with overbite treated with the Incognito® technique. The evaluation of overbite correction is assessed by comparison of lateral cephalograms before and after treatment by the QuickCeph 2000® software. All the statistical calculations were performed using the Statview II software for Mac®

Results

The results revealed the efficiency of the Incognito Technique® in the overbite correction in despite of absence of bite planes in the majority of cases. The components of this correction are in order: Intrusion of the mandibular incisor, extrusion of the mandibular molar, weak extrusion of the maxillary molar and stability of the maxillary incisor, which was the results commonly found in previous studies on small samples. The study demonstrated also the increase of the lower face height in extraction and non-extraction cases

Conclusion

The Incognito Technique® is very efficient in the overbite correction. As the major component of overbite correction is mandibular incisor intrusion, it seems crucial on the aesthetic point of view to evaluate the smile line when overbite correction is needed.

Magali Mujagic

Guest lecture

Indirect bonding of a retention wire : the Quick Die® procedure

Retention is the ultimate step in orthodontic treatment; nowadays, it is common sense to recommend a life-long retention to ensure treatment outcomes. A reliable technique is the indirect bonding procedure of 3 to 3 wires, usually involving plaster dental casts.

The aim of this lecture is to detail the use of a silicone material, the Quick Die®, instead of plaster and to describe its advantages.

The in-office laboratory procedure will be explained as the clinical timing of the “debonding” appointment; within one hour, the upper and lower fixed appliances are removed and the retention wires bonded.

Anna Brechter

Guest lecture

An evaluation of lingual retainer failure bonded with or without liquid resin: A prospective randomized clinical study in a split mouth design

Objectives To prospectively evaluate the effect of liquid resin on lingual retainer failure after 3 months, 1 year and 2 years.

Materials and methods 30 patients (17 females, 13 males) with a mean age of 15.2 years at the time of bonding the retainer, accepted to take part in the study. Since the procedure was a split mouth design the six frontal teeth in the lower jaw, three on the right side and three on the left side, were randomized in the aspect of being the resin side or the non-resin side. The randomization decided which side to be bonded first and which side to have liquid resin in combination with the flowable composite. Half of the lingual retainers, the resin side, were bonded to the enamel surfaces according to the manufacturers protocol with liquid resin (Transbond XT) and a flowable composite (Transbond Supreme LV) and the other half of the retainer were bonded in the same way but without applying the liquid resin. Retainer failure, discoloration of the composite pads, calculus accumulation and caries were evaluated at different time points (3 months, 1 year and 2 years).

Results At 3 months the incidence of retainer failure was 0% on the resin sides and 1.1% on the non-resin sides and the failure occurred at the composite-wire interface. At the 1 year follow-up the incidence of retainer failure was 2.4% on the resin sides and 3.6% on the non-resin sides, and the failure still occurred at the composite-wire interface on all teeth. The differences between the sides were not statistically significant. Similarly there were no differences in incidence of calculus accumulation, discoloration of the composite pads or caries. We are now collecting the data for the 2-years follow-up.

Conclusion When using the materials we used in this study (Light Cure Adhesive Primer Transbond XT (3M Unitek), Transbond Supreme LV (3M Unitek) and a twisted wire PentaOne 0.0215 (Masel), the liquid resin does not seem to be essential when bonding retainers in the lower jaw 33-43.



Axel Bergman

Guest lecture

My experiences with miniscrews

BACKGROUND: Anchorage control is essential for successful orthodontic treatment. Each tooth has its own anchorage potential as well as propensity to move when force is applied. When teeth are used as anchorage, the unwanted movements of the anchoring units may result in a prolonged treatment time, and unpredictable or less-than-ideal outcome. Strategies for anchorage control have been a major factor in achieving successful orthodontic treatment since the specialty began. To maximize tooth-related anchorage, techniques such as placing roots into the cortex of the bone, differential torque and the use of various extraoral appliances or intraoral devices have been implemented. Temporary anchorage devices (TAD) obtain intraoral anchorage and eliminate the disadvantages linked with extraoral anchorage. In this study we used different miniscrews as temporary anchorage device. Miniscrews are a simple and relatively low-cost method to provide intraoral anchorage.

PURPOSES: The aim of this descriptive study was to describe how miniscrews can be used for different purposes in orthodontic practice and which complications that may occur.

MATERIALS AND METHODS: 68 miniscrews were inserted from the same operator with a standardized technique in the mandible and the maxilla in 45 patients with a drill free technique under local anesthesia over a period of 3 years. 4 different types of miniscrews with different screw length have been used. The miniscrews have been inserted in the attached/ unattached gingiva or the palatal mucosa. The different indications for the use of miniscrews in these patients are explained. Patient comfort during insertion and different complications that occurred during treatment are described.

RESULTS: 45 patients with different malocclusions and a variation of indications for using miniscrews are described in this study. A total of 68 miniscrews were inserted in these patients. A total of 9 miniscrews could not reach the treatment goal because of various complications. The failure rate of 13% in this study, could often be related to an inadequate oral hygiene.

CONCLUSION: The use of miniscrews as temporary anchorage devices in orthodontics are an important tool to obtain intraoral anchorage and eliminate the disadvantage linked with extra oral anchorage such as compliance problems, aesthetical and social factors. It is an easy and inexpensive method for temporary anchorage of orthodontic appliances.

This lecture will discuss the different aspects of this descriptive study as well as some of the experiences the author have learnt when working with miniscrews as temporary anchorage devices.

Developmental evaluation of craniofacial and skeletal morphology of prematurely born children"

Introduction More prematurely born children will be seeking orthodontic care in the years to come because of the great increase in the number of prematurely born children over recent years and improvement in neonatal health care. Preterm children are often described as having unique facial features, an example being a long and narrow face as a result of postnatal cranial molding over an extended time period. It has been debated if prematurely born children are delayed in skeletal growth compared to their peers. These aforementioned factors can have an effect on orthodontic diagnosis and treatment planning.

Materials and Methods A retrospective study of records taken at Eastman Dental Centre, Department of Orthodontics and Dentofacial Orthopedics was initiated. The sample consisted of 56 subjects who demonstrated a mean age of 13.8 years, and an average gestational age at birth 32.6 weeks. Subjects were divided into 'early premies' and 'late premies' based on gestational age at birth. Lateral and frontal cephalometric radiographs were analysed. Hand-wrist radiographs were evaluated with regard to their skeletal maturational index level (SMI level).

Results SMI level – no statistical difference was seen between the two 'premie' groups, and the overall SMI level distribution correlated well with norms. Upon examination of the lateral cephalometric radiographs the most pronounced differences were seen in the cranial base, an increased lower anterior facial height, a steeper mandibular plane and more upright lower incisors. Few parameters became progressively worse with increased prematurity, and these were mainly confined to the cranial base. Examination of the frontal cephalometric radiograph revealed that the lateral bones of the cranium, the cranial base and the mandible are significantly decreased when measured transversely, while the paramedian structures are unaffected. These lateral measurements become significantly more decreased with increased prematurity.

Conclusion Some factors that may be significant include the fact that 'early premies' on average seek orthodontic care approximately 1.3 years earlier than the 'late premies' group, possibly indicating more severe problems. Craniofacial structures may be affected more seriously in more severe premature births. Prematurely born patients are a growing population that the orthodontist needs to be aware of because of their unique craniofacial pattern and potential treatment needs.

Per Rank

Dentoalveolar compensation: gift of nature or handicap in orthodontic treatment planning?

What is the definition of "The Dentoalveolar Compensatory Mechanism" and how does it work? And what happens if the DCM is not working?

It is important to understand how this Compensatory Mechanism works if we want to understand what happens in the growing face. It is also important in diagnosis and treatment planning and for evaluating the risk of relapse.

Point **Class 2: perfection of means, confusion in aims**

Contemporary Orthodontics is defined by the goals that we, as orthodontists, consider relevant for our patients. In a RCT these goals are defined by the inclusive criteria of the study, in an orthodontic treatment by the type of records that we use to produce our Tx Plan.

In an **Occluso-centric approach** the presence of an occlusal discrepancy, for example a Class 2, implies its correction by using treatments (Twin Blocks, Herbst, Class 2 elastics, distalizing devices, TADS ...) whose aim is to normalize the occlusion.

In a Class 2 a positive Overjet and a Molar distal Relation define the direction of treatment and the implicit criteria of success.

There are 3 Paradoxes in this approach:

1. a Class 2 Patient is considered a " pure" case constant in time
2. the patient must change to fit the treatment modality to correct his/her overjet
3. the correction of the occlusion excludes any accountability of the orthodontist for other factors that are not central to the treatment.

In a **Face Driven approach** the face dictates the direction of correction of the overjet. Orthodontic Camouflage is an option to be considered with Limitations. There are aesthetic limitations to the amount of dental compensations that we can provide.

There are skeletal limitations that often cannot be completely assessed at the beginning of treatment and therefore need to be re-evaluated during treatment. Face driven Surgery is considered a valuable option to overcome these orthodontic limitations, therefore orthodontic camouflage should not make the surgical correction more difficult or impossible.

Limited treatment (partial occlusal correction) is considered when any delay in treatment would produce a significant disadvantage for the patient. The partial occlusal correction of the malocclusion leads to an aesthetic improvement coherent with the chief complaint of the patient.

Limited treatment makes the option for further comprehensive treatment easier, quicker and more economic.

Herman van Beek

Counterpoint: There is no confusion in aims, they just differ

Serious overjets can be treated to excellent results. For the impossible cases we have the surgeon.

Point: In favour of a shift toward surgery:

Indiscriminate Class II bite jumpers render suboptimal results.

The issues:

- Poor diagnosis of which part of the face is at fault
- Lengthy bothersome functional treatments that do not lead to the goals
- Compliance
- Partial correction at best
- Camouflage leads to poor aesthetics
- Relapse

In capable hands, surgical risks and efficient interdisciplinary treatment provides superior aesthetic results, following refined specific aims.

Counterpoint: limit surgery.

- The “functional” people are well aware of aesthetics and provide optimal treatment on an individual basis. Surgery should be restricted to the caricatures for obvious reasons like risks
- Applying strict (but arbitrary) aims toward the “ideal” face is a *Procrustus* approach that threatens the personality in a face
- Big changes are psychological volcanos
- A normal face has no strict norms
- Surgical results are not stable, failure and relapse are still issues
- Function will prevail
- Renouncing large overjet correction during growth may condemn patients to an operation they do not need.

The orthodontic profession balances between health service and beauty business. The balance should not shift to the right.

3D: Historical perspective in orthognathic surgery planning

The human head consists of different types of structures, i.e. soft tissue (skin, muscles, etc.), hard tissue (skull), and teeth. All three of them are of major importance in the analysis and planning of oral and maxillofacial (OMF) surgery and its preoperative orthodontic treatment.

During the last decades the analysis and planning process in OMF surgery or orthodontic treatment has been done by clinical investigation, radiographs, spiral CT scans, plain photography, model analysis and/or stereolithographic skull models. By using measurement techniques like cephalometry, the surgeon and orthodontist were able to plan the procedure, so trying to predict surgical and orthodontic outcome. New 3-D techniques have now been introduced and their role as potential routine imaging techniques will be discussed.

The presentation will especially provide information about the history of imaging techniques of the head and neck region, ending with an overview of the actual modern 3D modalities (3-D stereophotogrammetry (extends traditional photography with depth information), Cone Beam CT (makes realistic and accurate 3-D imaging of the facial anatomy possible with a low radiation dose) and digimodels (a 3-D digital representation of upper and lower teeth for orthodontic and dental applications)).

Martien de Koning

3D: Virtual Planning of Orthognathic Surgery: Toy or Tool?

In April 2009 3D-virtual planning was introduced in the preparation of bimaxillary orthognathic surgery cases in the Radboud University Medical Center.

Until now we have planned more than 200 cases and we will share with you the evolution and development of the process and workflow, the (dis)advantages, the (in)possibilities and the pitfalls of this relatively new technique.

We will follow one case extensively and this also will be a nice introduction for those who will attend one of the workshops later on or might even trigger you if you haven't subscribed yet.

Thomas Maal

3D: Future perspectives of virtual planning

The lecture about 3D planning in orthognathic surgery will focus on the possibilities but also the limitations of 3D planning in orthognathic surgery. Virtual surgical planning has been used in many surgical fields to improve the accuracy and efficiency of surgical procedures. The past decade 3D virtual surgery planning of orthognathic surgery became available and evoluated to a useful tool with a large application potential in orthognathic surgery.

This lecture will focus on:

- Processing of image data in preparation for virtual 3D planning
- 3D virtual planning, how it works.
- Advances in 3D prediction Planning for Orthognathic Surgery
- Advantages and pitfalls in 3D planning of orthognathic surgery
- The future of 3D virtual planning in orthognathic surgery

José Llamas

Incisors compensation and decompensation in Class III cases, treated orthodontically and surgically

An important question regarding orthognathic treatment in class III skeletal patients is: How much incisor decompensation is achieved prior to orthognathic surgery?

Few studies have been done with this item. In order to answer that question a study has been done comparing 25 class III skeletal patients treated with dentoalveolar compensation and 25 class III skeletal patients treated with maxillary or bimaxillary surgery. All of them were treated by the same orthodontist (Chiquito did it) and the same surgeons team. Variables have been measured through cephalometric values in lateral 2D Xray. Incisors inclinations have been measured prior to orthodontic treatment and after combined treatment. A statistical analysis has been performed and the results are presented and discussed. Results are compared with some studies published. The main conclusion is that lower incisor is better decompensated than the upper one.

Limiting factors in the Class III camouflage treatment: a potential protocol

The Class III skeletal malocclusion has been traditionally treated with a combined approach of orthodontics and orthognathic surgery or with a strategy of orthodontic camouflage. Some severe cases can be identified as ideal candidates for a surgical treatment whereas some others can be handled with orthodontics alone, with a reasonable expectation of an acceptable result. However, the problem remains for the borderline patient. In fact, limited information is available in the literature regarding the identification of the factors that can help in establishing the limits for one treatment modality or the other. Furthermore, the quantification of some of these factors, for practical purposes, is practically missing or very seldom suggested. Therefore, the decision making process remains a subjective reflection based on the “good clinical sense” of the orthodontist or just reduced to an “educated guess”. In order to add some information, hopefully useful in deciding the most suitable treatment option for the individual patient, we propose a clinical protocol based on five different factors. Namely: the skeletal discrepancy, the occlusal discrepancy, the periodontal condition, facial aesthetics and patient’s goals. For each one of these factors several parameters will be evaluated and, for some of them, an attempt to provide some reference numerical values will be made. Finally, a few clinical examples will be presented to illustrate the concepts discussed in the last part of the lecture.

Peter Schwärzler

An attempt to define the limits for dental compensation for skeletal discrepancies in Class II adult patients

The aim of this clinical presentation is to compare treatment results of adult patients with skeletal jaw discrepancy treated surgically or by orthodontic camouflage.

Two groups of 20 consecutive patients each were investigated. Both groups consisted of adult patients with mandibular deficiency.

Group 1 had been treated by a combined orthodontic-surgical approach, group 2 non-surgically with extractions. Profile changes and occlusal improvements are compared.

Based on the literature and in the light of different concepts of facial harmony an attempt is made to identify the limits for dental compensation.

Case examples to illustrate treatment decisions in borderline cases are presented.

Juan Carlos Perez Varela

Camouflage OR Surgery: Looking for the third way ...

A significant percentage of patients that come to our offices present different grades of skeletal malocclusions. Fortunately, only a small number of them are class III, given that the treatment of this discrepancy is a challenge to orthodontists due to the fact that the deformity is going to be more evident over time. According to Proffit, we have only two treatment possibilities in these cases: Camouflage or orthognathic surgery.

In this session we will analyze and discuss both of these possibilities and also look at a third alternative using a combination of TADs and an outpatient surgery using local anaesthesia and sedation, for patients not looking to significantly change their facial aesthetics.

We are going to analyze the possible indications, advantages, and disadvantages of these three possible alternatives.

Sabine Ruf

Class II orthognathic surgery Tx - does it really improve the facial profile?

Aim

To assess the subjective perception of Class II orthognathic surgery patients' change in facial profile by orthodontists and lay persons and if possible to define borderlines for facial profiles prone not to profit from a surgical intervention.

Material

40 black profile silhouettes of 20 Class II patients were created from extraoral photographs. The before and after surgery silhouettes of patients were divided into two evaluation sets, which contained the silhouettes in a random order. The sets were scored separately at least 24 hours apart. Four groups of male evaluators 10 orthodontists (age 35-45 years), 10 orthodontist (age 46-56 years), 10 lay persons (age 35-45 years) and 10 lay persons (age 46-56 years) rated the attractiveness of the profiles using a VAS (endpoint: least/most attractive).

Results

The results of the study will be presented.

Ethical aspects of orthodontic treatment planning

Orthodontic treatment planning should be aimed at improving the quality of life of our patients. Traditionally, we treat malocclusions in order to decrease caries and periodontal susceptibility, improve function, and prevent trauma to incisor teeth. Most important, however, is an aesthetic improvement that the vast majority of our patients are seeking.

When looking more in detail at these claimed benefits, it appears that a person's willingness and motivation to maintain oral hygiene, avoid frequent carbohydrate intake and use local fluoride applications have a far greater impact on dental caries than does tooth alignment. Similarly, there is no evidence of a beneficial effect of orthodontic treatment on periodontal health despite better functional occlusions, with the exception of traumatic impingement of teeth into the periodontal tissues.

As to a claimed beneficial effect of orthodontic treatment on functional improvement, it seems that no single occlusal factor is of major importance for the development of TMD, but a lateral forced bite between retruded contact position and intercuspal position, as well as unilateral crossbite, may be a potential risk factor in this respect.

Treatment should balance the expected benefit of correcting malocclusions against the costs. Costs are money, time, discomfort, and possible risks. Risks range, among others, from possible damage to the enamel, root resorption, gingival recessions to increased risk of cancer from diagnostic X-rays, in particular CBTs, but also lateral cephalograms.

The Hippocratic oath clearly addresses the principles of non-maleficence and beneficence. It states that the practitioner's goal is to provide care for the benefit of the patient, and avoid harm. One test of the non-maleficence and beneficence principles is this pertinent question: will the patient be better off if this particular treatment is performed?

Routine lateral cephalograms and CBTs, particularly those taken after an orthodontic treatment for the sole purpose of evaluating the effects of treatment and demonstrating the skills of the practitioner at Board examinations or for applying to the ASE, clearly violate the principle of non-maleficence and are illegal according to European legislation. How can we justify these procedures?

The next aspect is the intended treatment plan. If we are not proposing to attempt an ideal end result, we feel obliged to present a justification for this limited treatment. However, in light of the above mentioned questionable benefits of orthodontic treatment, it should require special justifications if we are going beyond the particular complaints of the patient.

How can we justify the extended treatment times necessary to achieve results as are on display in the adjacent room? Increased risks of decalcifications and root resorptions, not to mention prolonged discomfort or pain?

What are the benefits of establishing immediate canine rise besides aligning the "Social Six" upper front teeth, which were the only reason a patient was seeking our service? Is there a better periodontal prognosis, or a better prognosis for the temporo-mandibular joint, or does this prevent excessive tooth wear? Has this been shown reliably?

Of course, there are patients who search for the "best", as there were always people who wanted a portrait by Leonardo da Vinci and were willing to pay the cost. But balancing risks and benefits, do we really know which is the best?

So again, how can we justify a full course of treatment, when the patient has only a limited complaint?

Claudia Aichinger

Point: The „Six Keys“ and a stable condylar position, why we should bother.

Orthodontists are performing a full mouth reconstruction in enamel (Ron Roth). Keeping this in mind, it seems reasonable to implement principles in orthodontic patients that apply in reconstructive and prosthetic dentistry.

What are signs and symptoms of occlusal interferences? What is the range of normal, and is a normal occlusion an adequate treatment goal, or should we strive for the ideal occlusion in our patients? What are the long-term sequelae in limited orthodontic treatments? Do children and adolescent patients adapt to interferences, or do we have to expect long-term consequences in the orognathic system of these patients?

I will use patient examples, and review the literature to support my point of view, that orthodontists should try to achieve the six keys and a stable condylar position in treating their patients.

Julian O'Neill

Counterpoint: The six keys and a stable condylar position. Why bother!

There is little evidence to support early correction of certain inter-arch relationships to a well inter-digitated Class I occlusion.

This would include the following common situations:

1. Reduction of a mild to moderately increased overjet.
2. Correction of a Class II buccal segment relationship.
3. Correction of posterior crossbites with no displacement.
4. Production of a mutually protected occlusion with no non-working side interferences.

Indeed, there is little evidence that patients in the full adult dentition would benefit from orthodontic treatment to correct the above. There may however be a desire on the part of the patient to do so.

This, however, does not constitute orthodontic need.

Non-compliance treatment in case of occlusal asymmetry in mixed dentition

Aim To investigate the changes in the occlusion using resin bite blocks bonded on the deciduous molars in mixed dentition.

Subjects and Methods 38 consecutive patients (mean age: 8y 2m / sd: 1y 1m), who showed a class II subdivision molar relationship after RPE anchored on deciduous teeth in the mixed dentition, were treated with resin bite blocks bonded on the deciduous molars with the purpose of keep the mandible in a class I molar relationship and allow first permanent molars to settle spontaneously. All patients were observed at T1,T2 and T3 (respectively at 6, 12 and 24 months), one group (34 patients) at T4 (after the eruption of the first premolars), and T5 (permanent dentition) in order to investigate the occlusal relations on the first permanent molars.

Results Statistically significant correction of the molar relationship was observed in 78,57% of the patients at the end of the transition (T4).

Conclusions Rapid palatal expansion and bonded bite blocks on the deciduous molars in the mixed dentition produced non-compliance statistically significant correction of class II subdivision of first permanent molars.

Ama Johal

Anterior cross bite correction in the early mixed dentition

The presentation will provide a review of the available literature evaluating the evidence for correction of an anterior cross bite, with or without an associated with mandibular shift/displacement, in the early mixed dentition. The relative advantages and disadvantages of undertaking early intervention, along with the range of techniques available will be discussed.

Lysle Johnston

Early treatment without smoke and mirrors: the Gianelly/Dugoni approach

There are four theoretical strategies available for the correction of Class II malocclusion: move the maxilla and/or its teeth backward; grow extra mandible or slip lower anchorage. Company marketing notwithstanding, growing extra mandible is probably impossible (although its normal pattern is favourable). Moreover, a ponderable distal displacement of the midface seems unlikely, and despite claims that expansion and flaring produce enhanced facial aesthetics, forward movement of the lower dentition remains a questionable tactic. Further, because bone can't grow interstitially, lower arch perimeter is more or less fixed or decreasing. It will be the purpose of this presentation to argue that lower "E-space" and the maxillary dentition (often called the wrong teeth in the wrong jaw) present the only rational therapeutic opportunities in Class II treatment.

What treatment is best in the correction of unilateral posterior crossbites?

Introduction: The treatment need owing to unilateral posterior crossbite is estimated to 10% of the child population. If untreated, the condition may cause adverse effects on the temporo-mandibular joints, masticatory system and facial growth. Treatment can be performed early (primary to mixed dentition) and late (permanent dentition) and be carried out with slow or rapid transversal expansion. Because of the high prevalence of posterior crossbite, treatment engages a great part of the total resources in orthodontic care. There are however few cost evaluation studies as well as studies of long-term stability of posterior crossbite correction in the mixed dentition.

Aims: Firstly, to compare long-term outcomes in patients with crossbite correction by using matched controls with normal occlusion, and secondly, to determine the costs of correcting posterior crossbites in the mixed dentition with Quad Helix (QH) or expansion plates (EPs) and to relate the costs to the effects.

Subjects and methods: According to a randomized controlled trial protocol and after 20 subjects had been treated for crossbite with a quad-helix and 15 with an expansion plate, the subjects were followed for 3 years post treatment. All had fulfilled the pre-treatment criteria: mixed dentition, unilateral posterior crossbite, no sucking habits, and no previous orthodontic treatment. Transverse relationships, maxillary and mandibular widths, overbite, overjet, arch lengths, and midlines were registered on study models before and after treatment and at the follow-up 3 years after treatment. The matched control group comprised 20 subjects with normal occlusion and was compared with the first and last registrations for the treated groups. To determine which alternative has the lower cost, a cost-minimization analysis was undertaken in 40 subjects who had undergone treatment for unilateral posterior crossbite: 20 with QH and 20 with EPs. Duration of treatment, number of appointments, broken appointments, and cancellations were registered. Direct costs (for the premises, staff salaries, material and laboratory costs) and indirect costs (loss of income due to parent's assumed absence from work) were calculated and evaluated for successful treatment alone, for successful and unsuccessful treatment and re-treatment when required.

Results: At follow-up, changes in the treatment groups were equal and stable. The changes were comparable with the control group. However, in treated patients, mean maxillary widths never reached those of normal control subjects. All other changes were minor and had no clinical implications. The QH had significantly lower direct and indirect costs, with fewer failures requiring re-treatment. Even the costs for successful cases only were significantly lower in the QH than in the EP group.

Conclusions: If crossbite is successfully corrected by the quad-helix appliance or the expansion plate, similar and good long-term stability is achieved. Furthermore, the results clearly show that in terms of cost-minimization, QH is the preferred method for correcting posterior crossbite in the mixed dentition.

Stravos Kiliaridis

Early correction of posterior crossbite: Is there any beneficial effect on the masticatory system?

The objective of this lecture is to provide an evidence based approach to evaluating the necessity of early treatment in children with a unilateral posterior crossbite.

The presence of a unilateral posterior crossbite has been held responsible for predisposing to temporomandibular disorders, functional aberrations, and facial skeletal asymmetry. Early treatment of unilateral posterior crossbite is often performed in order to reduce these risks. However, what is the recent evidence on the benefits of early treatment and how early should such a treatment be carried out?

Learning Objectives

1. To understand the role of unilateral posterior crossbites as predisposing factors in temporomandibular disorders.
2. To learn how early a unilateral posterior crossbite should be treated in a growing child.

Lysle Johnston

Edward H. Angle, In His Own Words

Edward H. Angle was the first to specialize and, in the process, he more or less invented our specialty. Indeed, his students were instrumental in the formation of the European orthodontic Society. More to the point, he crafted our sustaining mythology—that orthodontics is a learned medial calling based in fundamental biological principles.

In the 21st century, one may disagree with his science (or any science, for that matter); however, he thought most of what we think today, did most of what we do today, and invented many of the ways we do things. One result of these achievements is the European Angle Society, a distinguished group that is, unfortunately, a century and thousands of miles removed from the man, himself. It will be the purpose of this “add-on” presentation to attempt to bridge some of this gap, both in time and space.

Davide Mirabella

Orthodontic Implant Site Development: new clinical concepts and research data

The aim of this presentation is to discuss the role of 3-D orthodontic tooth movement in generating the proper amount of soft and hard tissues for optimal implant placement, and its stability in the long-term. Clinical research data about soft and hard tissue response to orthodontic forced eruption will be presented, accurate clinical procedures will be suggested to enhance the effect of tooth movement in generating soft and hard tissue, and increasing the esthetic outcome.

Learning Objectives

- Hard and soft tissue response to OISD
- New clinical protocols

Benefits from Early Treatment in Class II Patients - Preliminary Results of a Cohort Study

Aim: To conduct a retrospective cohort study in order to find out if an early intervention with extraoral traction and eventually preserving the leeway space in the lower jaw would result in any benefits for class II patients such as less extractions, less incisor proclination, shorter treatment time, reduced need for full fixed appliances or lower treatment costs.

Patients and Methods: 222 consecutive patients with finished treatments without initial crossbites, impacted teeth, clefts, JIA; no TADs nor orthognathic surgery. Early treatments (ET; N=110, 51 girls and 59 boys; mean age 10.8 years \pm 1.2 months) were started before the establishment of the first premolar occlusion and before eventual exfoliation of the lower second deciduous molars (in case of crowding). Late treatments (LT; N=112, 59 girls and 53 boys; mean age 12.4 years \pm 1.4 months) were started after these time points. The percentage of non-extraction, extraction in the upper arch only and bimaxillary extraction and the inclination and sagittal position of the lower incisors, the percentage of full fixed appliances needed, overall treatment time, number of appointments and treatment time with full fixed appliances as well as the treatment costs were analysed.

Results: There were 82.7% non-extraction, 2.7% extractions in the upper arch only and 14.5% bimaxillary extractions in the ET group, whereas the corresponding numbers were 64.3%, 18.8% and 17.0% in the LT group. Although there was a higher percentage of non-extraction patients in the ET group, the non-ex LT patients resulted in 5.8° to 6.3° more lower incisor proclination when compared to the non-ex ET patients. The overall treatment time was 8.1 months (23.5%) shorter in the LT group, but the treatment time with full fixed appliances was 2.3 months (12.5%) shorter in the ET group. 95.4% of the LT patients needed full fixed appliances whereas these were only 71.4% in the ET group, leading to 12.6% lower costs. The ET needed on average two more appointments.

Conclusion: ET of class II patients with extraoral traction and eventually preserving the leeway space in the lower jaw reduces the treatment efforts and costs significantly and markedly in more than one third of the patients. For the other two thirds of the patients, slightly higher costs and longer overall treatment times are the consequences. The indication of the right starting point is crucial in treatment planning although the orthodontist is quite often forced to start an early treatment anyway due to local factors like attrition of incisors, undermining resorptions, regain of space or correction of lateral crossbites and asymmetries.

A 32 - year follow-up study of Herbst therapy

The aim of this very long-term follow-up investigation after Herbst treatment was to reexamine previous adolescent patients (12-14 years of age) at least 30 years post-treatment. The study is planned to comprise four parts: (1) an analysis of dental casts, (2) an analysis of lateral head films, (3) an analysis of the mandibular incisor segment (incisor inclination, tooth irregularity and gingival recessions) and (4) a functional analysis of the craniomandibular system with special reference to the TMJ using the method of CBCT.

The patients to the four parts of the investigation were derived from a well-defined sample of 22 consecutive Class II, Division 1 malocclusion cases treated with the Herbst appliance at the University of Malmö-Lund / Sweden in 1977-1978. The cephalometric treatment effects in this sample were presented in two articles from 1982 (Pancherz 1982a, 1982b).

In the years 2011 and 2012, 30-33 years after Herbst therapy, the above 22 patients were recalled to the Orthodontic Department in Malmö for a follow-up investigation. At this time, the subjects were 42 to 48 years of age. Two persons were deceased and six did, for several reasons, not come. Thus, the final follow-up sample comprised of 14 subjects (12 males and 2 females) Treatment in all subjects was performed with a banded type of Herbst appliance with a simple anchorage system.

The 14 subjects were analyzed at four occasions:

- T1 - Before Herbst treatment
- T2 - After treatment, i.e. 12 months after that the Herbst appliance was removed and the occlusion had settled.
- T3 - 6 years after treatment, at an average age of 20 years, when the radius epiphysis/diaphysis plate was closed.
- T4 - 32 years after treatment at an average age of 46 years.

Changes were assessed during the following observation periods:

- T1-T2: treatment changes of 18 months (6 months of active treatment + 12 months of settling of the occlusion).
- T2-T3: early post-treatment changes of 6 years.
- T3-T4: late post-treatment changes of 26 years.
- T2-T4: total post-treatment changes of 32 years.

In summary, the following long-term post-treatment (T2-T4) results were found:

- Overall, the occlusion was acceptable stable at T4 in 64 % of the cases. Only insignificant changes occurred after the age of 20 years (T3-T4).
- Mandibular incisor tooth irregularity increased in many cases over the period T2-T4 and was not thought to be related to Herbst therapy but was more likely a result of physiologic processes throughout life.
- Minor labial gingival recessions seen on a few mandibular incisor teeth (T4), seemed not to be related to Herbst treatment.
- Unexpected was the finding that all 14 subjects exhibited a large amount of craniofacial growth after the age of 20 years (T3-T4).

- Signs of osteoarthritis at T4 were seen in 5 (18%) of the 28 TMJ's. These signs were not reflected by any subjective patient symptoms. The results corresponded to figures found in the general population.

References

Pancherz H. The mechanism of Class II correction in Herbst appliance treatment. Am J Orthod 1982a; 82:104-113.

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Christos Katsaros

Lingual orthodontics: An alternative for the everyday clinical practice?

The technological developments of recent years have opened new possibilities in the customization of lingual orthodontic appliances.

This lecture will discuss the role of modern lingual orthodontics in the everyday clinical practice. The first part of the presentation will deal with a systematic review of the literature concerning effectiveness and shortcomings of lingual orthodontics, while in the second part treated cases with various degrees of difficulty will illustrate the possibilities of this technique.

Frank Weiland

Epigenetic orthodontics - Era or Episode?

Periodically old treatment concepts and appliance systems are reintroduced. This reintroduction is often accompanied by marketing noise and pseudo-scientific evidence. Lately, the advances in genetic knowledge seem to have encouraged an orthodontist to rename the treatment with modified Schwartz plates. Epigenetic Orthodontics and the DNA-Appliance were born!

This short lecture aims at showing that dangerous nonsense is used as an orthodontic business plan by some.