

# Importance of Lateral Cephalogram in Treating Class III Patients

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**Abstract— Introduction:** The need for an early identification and treatment of the skeletal Class III malocclusion is accepted worldwide. The treatment success in class III patients depends on the malocclusion type and the case individualization. The treatment choice is extremely difficult, and increases with involvement of the skeletal and occlusal structures. In certain situations, when growth pattern is unfavourable, combined surgical-orthodontic treatment needs to be applied. The aim of this paper is to discuss some aspects of the skeletal class III malocclusion. **Subjects and methods:** patients who addressed our Orthodontic Department, in Cluj-Napoca, Romania, during 2010-2013. Twenty-five subjects, diagnosed with class III malocclusion have been studied. The diagnosis has been established clinical and paraclinical. The treatment was individualized in each case based on patient's age and difficulty index of the malocclusion. Lateral cephalometry was used to assess skeletal pattern before and after treatment. Skeletal vertical and horizontal relationships were evaluated according to Tweed, Sassouni and Hasund/Segner. Statistical data processing was performed using the Statistica 7.0 software version for Windows, using the Principal Component Analysis (PCA) and the Varimax method. **Results and discussion:** There were encountered associated anomalies: mandible shift (20%), asymmetries (20%), crowding (40%), canine impaction (4%), open bite (4%), tooth transposition (4%). Nineteen patients (76%) were treated without extractions; 6 patients (24%) had tooth removal (bicuspid or first molars). Six patients (24%) were treated by orthodontic treatment and orthognathic surgery. **Conclusion:** A stepwise analysis influences the individual treatment of skeletal class III malocclusion, which predicts the treatment choice: orthodontic treatment or a multidisciplinary approach.

**Keywords—** class III malocclusion, lateral cephalogram, orthodontics, orthognathic surgery

## I. INTRODUCTION

The need for early identification and treatment of the skeletal Class III malocclusion is accepted worldwide. In class III patients the success of the treatment depends on the malocclusion type and the case's individualization [1]. The treatment choice is extremely difficult, and it increases with involvement of the skeletal and occlusal characteristics. In certain situations, when growth pattern is unfavourable, a combined surgical-orthodontic treatment has to be chosen [2]. The difficulty of the case increases when class III malocclusion is associated with open bite or mandible shift. The treatment needs to be individualized [3]. The treatment plan

should include all the patient's symptoms. The treatment type is chosen depending on the patient's symptoms and on the analysis of the lateral cephalogram. Usually the orthodontic treatment precedes the surgical treatment, having the role to correct the jaw discrepancy and to obtain proper teeth alignment. The surgical approach involves commonly both, the maxilla and mandible, being in accordance to the skeletal and occlusal modifications of the malocclusion [4,5]. The maxilla is enlarged and jaw surgery is performed to establish occlusal harmony [6,7].

The aim of this paper is to discuss the management of skeletal class III malocclusion.

## II. MATERIAL AND METHODS

Twenty five patients (14 females and 11 males, SD=4.89) with class III skeletal malocclusion (selected through a prospective method from patients who were referred to our orthodontic department, from Cluj-Napoca, Romania between 2010 and 2013 (treated by an orthodontist, VT) with ages between 6 and 23 were studied. Lateral cephalometry was used to establish skeletal pattern before and after treatment. Lateral cephalograms were performed directly with a 3D device (50–90 kV, 2–10 mA, exposure time 0.5-1.0 s). For ensuring the reliability of scanning, patients kept their teeth in centric occlusion during exposure, whilst using the cephalostat system. Skeletal vertical and horizontal relationships were evaluated according to the methods described by Tweed, Sassouni and Hasund/Segner. Following variables were evaluated: patient's age, the angles FMA, FMIA, IMPA, SNA, SNB, ANB, Z, PrAF, IdBM, Ii, NSL-ML, NSL-ML, Go (in degrees) and the distances AO-BO, HFA, HFP, OB, OJ (in mm). Statistical data processing was performed using the Statistica 7.0 software version for Windows, applying the Principal Component Analysis (PCA) and the Varimax method in order to determine the correlation between different variables. The cephalometric evaluation at the start of treatment showed the intermaxillary discrepancy in the antero-posterior and vertical dimension (Fig. 1). After orthodontic and surgical treatment, occlusal balancing and improvement of the intermaxillary relationships and of the esthetics of the face could be noted (Fig. 2). Six months after appliance removal, the overlapping of the lateral cephalograms shows no tendency to relapse and the maintenance of the results (Fig. 3).

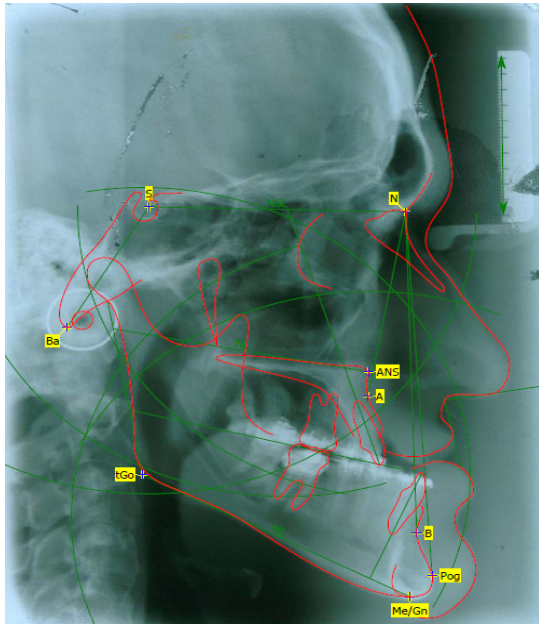


Fig. 1 Patient C.R., lateral cephalometric radiography, orthodontic stage, before treatment

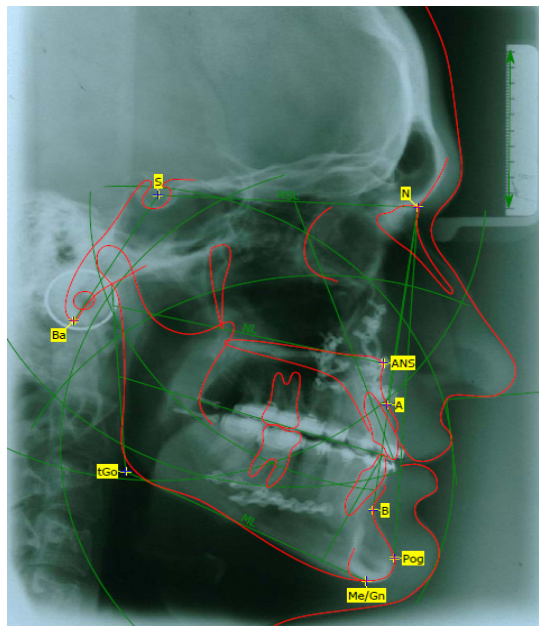


Fig. 2 Patient C.R., lateral cephalometric radiography, after orthodontic and surgical treatment

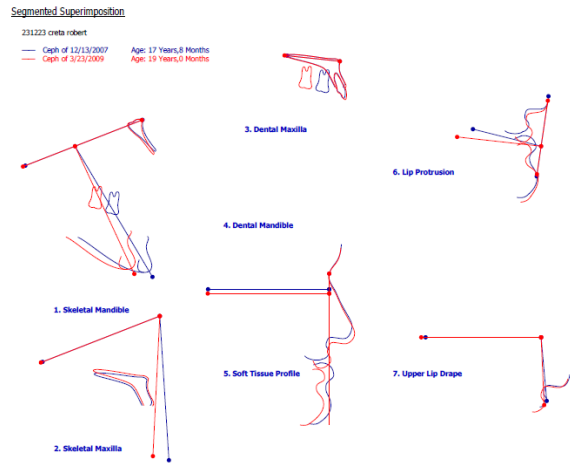


Fig. 3 Patient C.R.: Segmented superimposition before treatment, and after orthodontic and surgical treatment. An improvement of the occlusal relationships and esthetics can be observed.

### III. RESULTS AND DISCUSSION

Associated anomalies of the patients have also been diagnosed: mandible shift 20%, asymmetries 20%, crowding 40%, canine impaction 4%, open bite 4%, tooth transposition 4% (Fig. 4). When considering the type of space achievement, nineteen patients (76%) were treated without extractions; six patients (24%) have been treated by tooth removal (bicuspid or first molars). Regarding the treatment type, orthodontic or orthognathic treatment, six patients (24%) have been treated by orthodontics and orthognathic surgery, the other 19 patients (76%) being treated only through orthodontic methods.

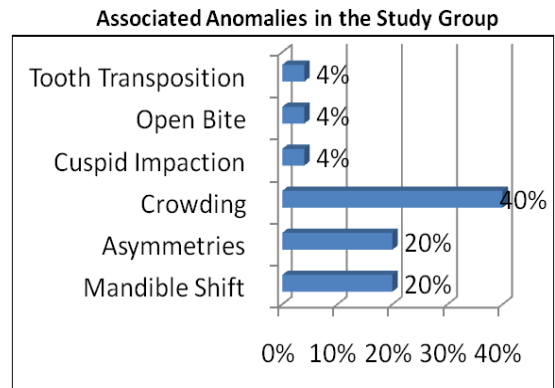
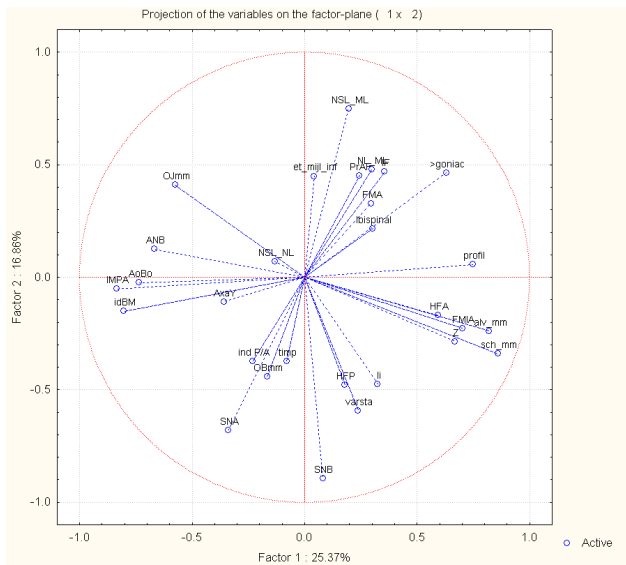


Fig. 4 Associated anomalies of the study group (SD=3.6)





c.

Fig. 5 PCA method analyses

#### IV. CONCLUSIONS

A well planned analysis, step by step, of each case influences the individual treatment of the skeletal class III malocclusion, which predicts the option of an orthodontic or combined treatment: orthodontic and surgical. Early diagnosis is very important to control the evolution of the malocclusion, because otherwise the orthodontic treatment remains just a preliminary step of a multidisciplinary treatment.

#### CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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