C L I N I C A L C A S E S

Modifying therapeutic objectives in accordance with patient's ethnicity

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INTRODUCTION

We took orthodontic records and began full-banded and bonded treatment soon after F, a 13 year 3 month old girl, who consulted us in 2007 at our office in a city of southwest France. F.'s loss of all four first premolars as an accompaniment to me-

chano-therapy was compensated for by the eventual successful eruption of her third molars. We were able to remove her appliances in 2009 as we had promised, before her 16th birthday.

TREATMENT HISTORY

Diagnosis

This young woman's facial architecture was generally well balanced with a slight Class III tendency (ANB 1.7° and AoBo: -6.2 mm). Her bi-alveolar, bi-maxillary status was quite marked even when her purely African ethnicity was taken into account. In no uncertain terms – so strongly expressed we do not feel it is appropriate to reproduce them here – she explained to us how fervently she wanted us to improve her facial appearance.

Discussion of the objectives of the positioning of her anterior dentition

In this regard, we needed to place her within the framework of our conception of how to treat and what objectives we should establish for patients of the various non-European ethnic groups we see in our offices, who are primarily from North Africa, the overseas territories, and West African areas near Abidjan and Dakar. The average incisal position of patients from these regions, in comparison to European

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Figures 1 a to c
At rest right profile, smiling, full face photos at the beginning of treatment 3/07, (13 y to 3 m).

Figures 2 a to c
Right, frontal, and left intraoral photos at the beginning of treatment 3/07, (13 y to 3 m).

Figures 3 a to e
Models: right, frontal, left, and maxillary and mandibular occlusal photos at the beginning of treatment 3/07, (13 y to 3 m).

Figure 4
Panoramic X-ray at the beginning of treatment
3/07, (13 y a 3 m).

Figure 5
Profile head film at the beginning of treatment 3/07,
(13 y a 3 m).

Figure 6
Tweed analysis tracing at the beginning of treatment
3/07, (13 y a 3 m).

Figure 7
Hash marks and Steiner box at beginning of treatment
3/07.

Analysis of space total	Anter.	Crowd. dent arch.	- 2	- 1.5	3
		Ceph corr.	- 5.6	- 1	5.6
		Soft issues	/	- 0.5	
		Total	- 7.6		
	Aver.	Crowd. dent arch.		1	
		C. of Spee	0	1	
		Total	0		
		Classe II(III)	+ 5		
	Post.	Crowd. dent arch.	- 20		
		growth	+ 3 (Tweed)		
		Total	- 17	0.5	8.5
		Total dental	- 19.6		

Figure 8
Tweed analysis at the beginning of treatment 3/07,
(13 y a 3 m).

a

b

c

*Figures 9 a to c
Right profile, frontal at rest and smiling photos at the end of treatment 12/09, (16 y).*

a

b

c

d

e

*Figures 10 a to e
a to c : frontal, right, and left intraoral photos at the end of treatment 12/09, (16 y) ;
d and e: occlusal, mandibular, and maxillary photos at the end of treatment 12/09, (16 y).*

a

b

c

*Figures 11 a to c
Mandibular and maxillary occlusal views at the end of treatment 12/09, (16 y).*

Figures 12 a and b
Occlusal views of the mandibular and maxillary models at the end of treatment 12/09, (16 y).

Figure 13
Panoramic X-ray film
at the end of treatment 12/09, (16 y).

Figure 14
Cephalometric film at the end of treatment 12/09, (16 y).

Figure 15
Tweed tracing at the end of treatment 12/09, (16 y).

Figure 16
Smiling photo after therapy 2/10, (17 y 2 m).

a

b

c

Figures 17 a to c
Intraoral photos, right, left, and frontal after therapy 2/10, (17 y 2 m).

a

b

Figures 18 a and b
Profile changes.

standards range from up to +2 mm for North Africans and up +6 mm for West Africans. The average incisal positions of people from the overseas territories lie between these two extremes.

We should remember here that in regard to the particular case of our patient the average incisal positions of West Africans, according to a multi-ethnic study of three countries in the region are:

- Upper Incisors (I/NA) : +4 mm / +3.5° ;
- Lower Incisors (I/NB) : +7 mm / +10° ;
- On average, accordingly T +5.5 mm / +7°.

F. born 12/1997	3/07 13 of 3 m	12/09 16 of
SNA	88	87.5
SNB	86.3	84.7
ANB	1.7	2.8
SND	81.5	80.8
1/Namm	11.5	4.5
1/NA°	30.5	19
1/NBmm	9.5	5
1/NB°	32.5	20
Pog/NB	-2.5	-1.5
1/1	115.5	138
Occl/SN	14.5	16
GoGn/SN	30	31
SE	19	18
SL	66	65

Table I
Steiner analysis at the beginning and end of treatment.

In comparison to European standards these ethnic bi-maxillary protrusions are:

- more linear than angular (à linear protrusion of 5.5 mm would correspond to an angular protrusion of $5.5/0.4 = 13.75^\circ$) ;
- more mandibular than maxillary, by a Class II compensation: West Africans have an average ANB of 4.5° ;
- more marked in Dakar than in Abidjan.

We must, of course, also take the personal esthetic values of African and overseas patients living in France into account. Many of them want to obtain treatment results more in conformity with European values than with their

F. born 12/1997	3/07 13 of 3 m	12/09 16 of
FMIA	60.5	71
FMA	25.5	27
IMPA	94	82
SNA	88	87.5
SNB	86.3	84.7
ANB	1.7	2.8
AoBo	-6	-5
Occl /F	7.5	9.7
Z	75	80
U lip	10.5	13
T chin	16	12.5
HFP	43.5	45
HFA	70	72
HFP/HFA	0.6	0.6

Table II
Tweed analysis at the beginning and end of treatment.

own ethnic standards, which was the case with our patient.

In her case we would obtain chevrons of $2/+1./+1/-1.5$; so we increased our positional objective by 6 mm and obtained $2/+7/+7/-1.5$. But, informed of the lesser lip retrusion, she could expect, our patient asked us to seek a larger reduction; this led us to adopt a revised objective of $2/5.5/5.5/-1.5$.

Calculation of placement and objectives of preserving the posterior dentition

The original posterior deficit is – 20 mm.

In addition, we need to take into account an anticipated anchorage loss of 5 mm to be balanced by expected growth.

To estimate posterior growth we had three available means of calculation:

1. The regression equation, gain of place/age (girls):
Gain of place = $33 - 1.722 \times \text{age}$, which gives us: 10 mm;
2. Average growth for 12 year-old – age of adult (female), value that must be lowered here because patient is already twelve: 11,9 mm;
3. Tweed's quite pessimistic 'estimate, which predicts practically no growth because growth ends for females at about the age of 14.

Accordingly, our best estimate of the expected available space would be $-20 + 5 + 10 = -5$ mm.

It must be remembered that these estimates utilize a posterior available space limited by the anterior edge of the ascending ramus: but we know that lower third molars can erupt into functional positions when there is an apparent 4 to 6 mm lack of space because, in fact, their distal portions lie on 2 to 3 mm of that ascending branch. In this case, we are almost certain that we shall be able to put all four third molars in place, eventually by a light limitation of anterior repositioning.

Treatment

Our patient was highly cooperative throughout treatment wearing elastics as instructed, an important contribution, no doubt to our post-treatment records showing results were better than our predicted objectives.

The patient is extremely pleased with the facial esthetics obtained. Moreover, the third molars erupted early, during treatment, allowing us to guide them into excellent position.

Looking at these excellent results, it is easy to answer the question "Should first bicuspid be extracted?" affirmatively. But it was not so easy to do so at the beginning of treatment when some practitioners, who might not have taken the positive development of the posterior dentition or the primacy of facial esthetics into serious consideration, might have hesitated.