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Case Report

Orthodontic Treatment with the Ultima Damon System, Four Permanent Contact Points for Precise Control of Rotation, Angulation, and Torque-Case Report

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Summary

DAMON ULTIMA™ is the first full orthodontic treatment system specifically designed for faster and more accurate finishing. The DAMON ULTIMA™ system features a slot in the shape of a parallelogram. In connection with the new the patented DAMON ULTIMA™ arch (rounded square arch) enables a direct interaction at the vertical and horizontal contact points (7) (Figures 1, 2).

Figure 1

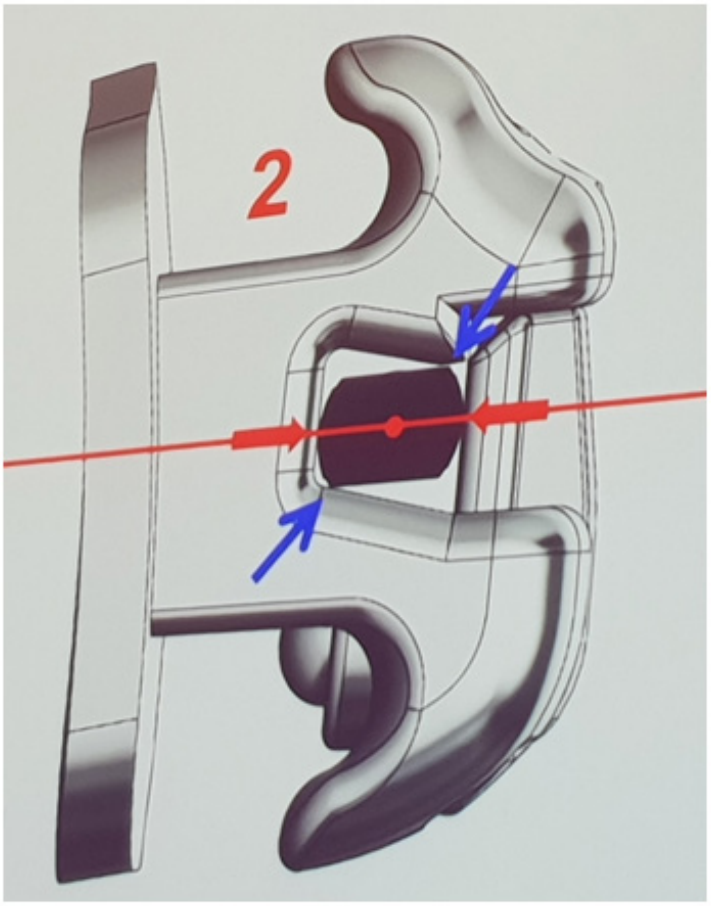


Figure 2
Figure 1, 2: Comparison between Damon Q Bracket and Damon Ultima bracket.

Early rotation control is enabled with the very first DAMON ULTIMA™ archwire. The complete transmission of the bracket values (torque/angulation) is achieved with gentle forces from the use of the second DAMON ULTIMA™ archwire (.016 x .0275 CuNiTi) (Figure 3).

Figure 3: DAMON ULTIMA wire called a combination wire.

Keywords: Self-ligating brackets; Damon system; Ultima bracket; Angulation; Torque

Clinical Case Study

Patient history

Patient: N/A Age: 17 years, 1 month.

Diagnosis

At the diagnosis appointment, the following was determined: Skeletal class III. Bilateral crossbite, narrow upper and lower jaw with crowding in the anterior and canine areas, midline shift to the left.

A competent lip closure with a convex mouth profile.

Ceph analysis:

SNA angle was 74.4° (difference -7.6°, retrognacy OK), SNB angle was 77.4° (difference -2.6°, retrognacy lower), ANB angle was -3.0° (Difference -5.0° Skel. Class III), Wits was -8.5mm ((Difference -7.5mm, Skel. Class III).

The lower incisors showed a strong retrusion to the Me-Go line with -21.7°.

Figures 4a-d are the extraoral images and Figures 5a-e are the intraoral images.

Figure 4a

Figure 4b

Figure 4c

Figure 4d
Figures 4a-d: Extraoral images.

Figure 5a

Figure 5b

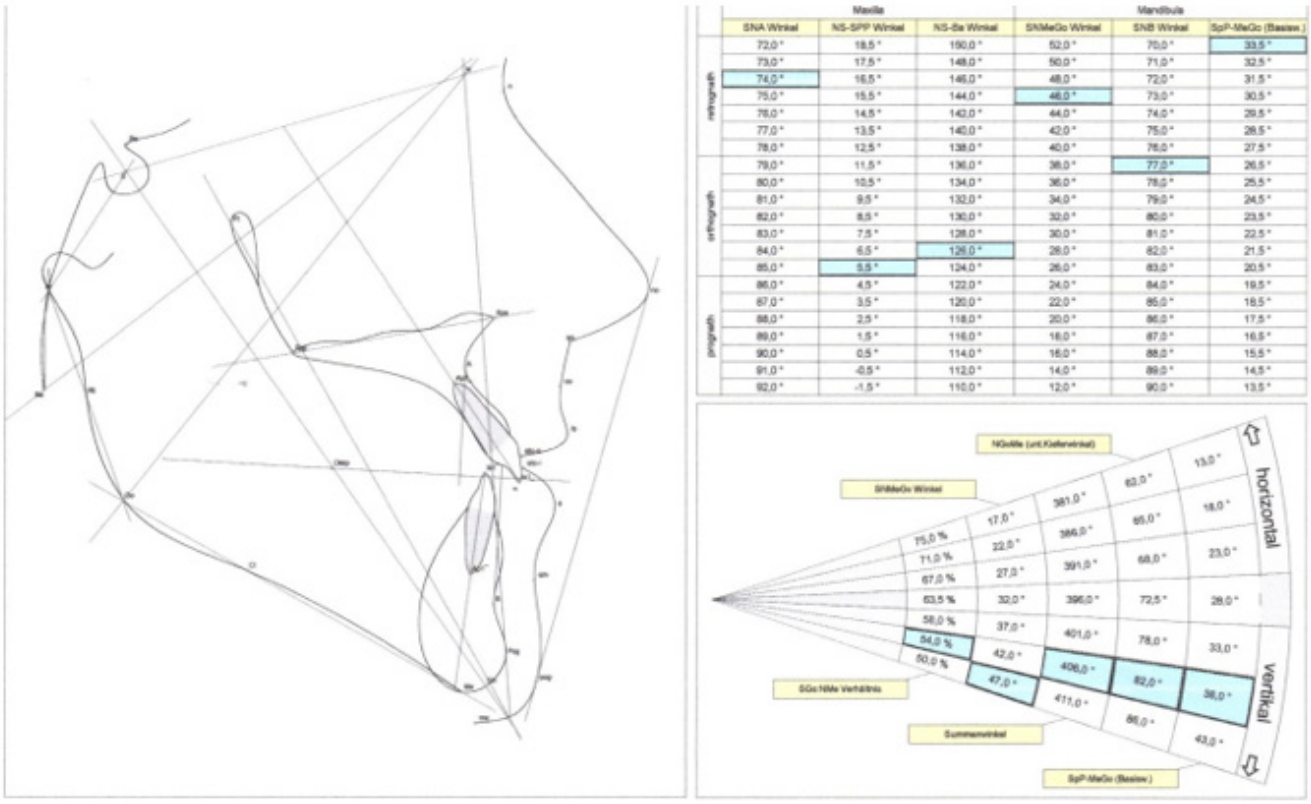
Figure 5c

Figure 5d

Figure 5e
Figure 5a-e: Intraoral images.

In Figures 6, 7, and 8 are, the cephalometric image with the evaluation and the orthopantomogram.

Figure 6



	Maxilla			Mandibula		
	SNA Winkel	NS-SPP Winkel	NS-Ba Winkel	SNMeGo Winkel	SNB Winkel	SpP-MeGo (Basion.)
retrognath	72,0 °	18,5 °	150,0 °	52,0 °	70,0 °	33,5 °
	73,0 °	17,5 °	148,0 °	50,0 °	71,0 °	32,5 °
	74,0 °	16,5 °	146,0 °	48,0 °	72,0 °	31,5 °
	75,0 °	15,5 °	144,0 °	46,0 °	73,0 °	30,5 °
	76,0 °	14,5 °	142,0 °	44,0 °	74,0 °	29,5 °
	77,0 °	13,5 °	140,0 °	42,0 °	75,0 °	28,5 °
	78,0 °	12,5 °	138,0 °	40,0 °	76,0 °	27,5 °
orthognath	79,0 °	11,5 °	136,0 °	38,0 °	77,0 °	26,5 °
	80,0 °	10,5 °	134,0 °	36,0 °	78,0 °	25,5 °
	81,0 °	9,5 °	132,0 °	34,0 °	79,0 °	24,5 °
	82,0 °	8,5 °	130,0 °	32,0 °	80,0 °	23,5 °
	83,0 °	7,5 °	128,0 °	30,0 °	81,0 °	22,5 °
	84,0 °	6,5 °	126,0 °	28,0 °	82,0 °	21,5 °
	85,0 °	5,5 °	124,0 °	26,0 °	83,0 °	20,5 °
prognath	86,0 °	4,5 °	122,0 °	24,0 °	84,0 °	19,5 °
	87,0 °	3,5 °	120,0 °	22,0 °	85,0 °	18,5 °
	88,0 °	2,5 °	118,0 °	20,0 °	86,0 °	17,5 °
	89,0 °	1,5 °	116,0 °	18,0 °	87,0 °	16,5 °
	90,0 °	0,5 °	114,0 °	16,0 °	88,0 °	15,5 °
	91,0 °	-0,5 °	112,0 °	14,0 °	89,0 °	14,5 °
	92,0 °	-1,5 °	110,0 °	12,0 °	90,0 °	13,5 °

Variable	Norm	Auswertung 13.09.2017	Differenz	Standardabweichung 5 4 3 2 1 0 1 2 3 4 5	verbale Einschätzung
GESICHTSSCHÄDEL					
NSAr (Sella-Winkel)	123,0±5,0 °	138,7 °	+15,7 °		Retrognathie
SArGo (Gelenkwinkel)	143,0±6,0 °	127,6 °	-15,4 °		Progenie-HW
ArGoMe (Kieferwinkel)	130,0±5,0 °	139,0 °	+9,0 °		posteriore Rotation UK
Summenwinkel	396,0±5,0 °	405,4 °	+9,4 °		vertikales Wachstum (OB)
ArGoN (ob.Kieferwinkel)	52,0±2,0 °	58,3 °	+6,3 °		vertikales Wachstum
NGoMe (unt.Kieferwinkel)	72,0±2,0 °	80,8 °	+8,8 °		vertikales Wachstum
KIEFERBASEN					
SNA Winkel	82,0±2,0 °	74,4 °	-7,6 °		Retrognathie OK
SNB Winkel	80,0±2,0 °	77,4 °	-2,6 °		Retrogenie
ANB Winkel	2,0 °	-3,0 °	-5,0 °		skel. Klasse III
SNPog Winkel	78,0±2,0 °	78,3 °	+0,3 °		
Facial Axis	90,0±3,0 °	82,6 °	-7,4 °		vertikales Wachstum
Inklinationswinkel	85,0 °	88,4 °	+3,4 °		tiefer Biss
Y-Achse	66,0 °	70,9 °	+4,9 °		Post. Lage UK (VW)
SNMeGo Winkel	32,0 °	45,4 °	+13,4 °		Retroinkl. UK
SpP-MeGo (Basisw.)	25,0±3,0 °	39,4 °	+14,4 °		vertikales Wachstum
VORDERE UND HINTERE GESICHTSANALYSE					
SGo:NMe Verhältnis	63,5±1,5 %	53,3 %	-10,2 %		vertikales Wachstum
DENTO-ALVEOLÄR					
1_-SN Winkel	102,0±2,0 °	107,9 °	+5,9 °		Protrusion OK-Fr.
1¯-MeGo Winkel	90,0±3,0 °	68,3 °	-21,7 °		Retrusion UK-Fr.
Interincisalwinkel	135,0 °	138,5 °	+3,5 °		Steilstand
1_-NPog Strecke	3,0 mm	5,4 mm	+2,4 mm		Anteposition OK-Fr.
1¯-NPog Strecke	0,0 mm	-1,6 mm	-1,6 mm		Retroposition UK-Fr.
Wits	-1,0±1,0 mm	-8,5 mm	-7,5 mm		Klasse III
OL-Ästhetik Line	-2,5±0,5 mm	-7,7 mm	-5,2 mm		
UL-Ästhetik Line	-1,0±0,5 mm	-6,0 mm	-5,0 mm		Konvex

Figure 7

Figure 8
Figure 6-8: Cephalometry, Tracing & Analysis Initial Figure 8: Orthopantomogram Initial.

Course of treatment

The bonding was complete in the upper and lower jaw.

Torque selection: the torque values were selected as follows: 13, 23, 33, 43,44 h.Tq, 12, 22, 31, 32, 41, 42 Low Tq, 11, 21, st.Tq.

Appointment *1: 04.05.2020*

A .013" CuNiTi wire was ligated into both jaws at the start of leveling.

Figure 9a

Figure 9b

Figure 9c

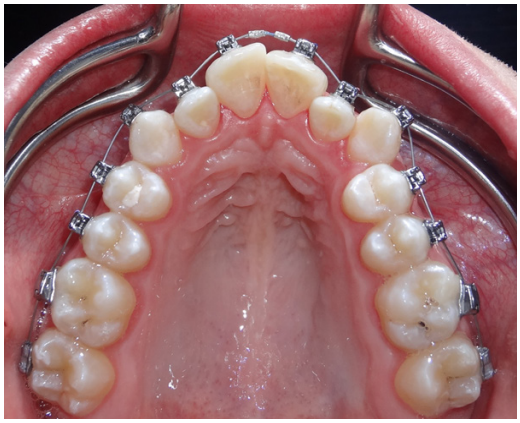


Figure 9d

Figure 9e

Figure 9f
Figure 9a-f: Intraoral image after banding.

Appointment *2: 06/22/2020*

Arch change in the upper jaw was a .018" CuNiTi

Appointment *3: 07/23/2020*

Arch change in the upper jaw, a .0140 x .0275 CuNiTi (this is the first size of Ultima wire) in lower jaw ligated .018" CuNiTi.

Appointment *4: 09/03/2020*

A cephalometry and orthopantomogram were performed at this appointment.

Appointment *5: 12.14.2020*

Arch change: up. 0160x.0275 SST, lwr.0140 X.0275 CuNiTi. Fig. 12a-f

Appointment 6: 04.04.2021

Arch change (up. 0.18 x .0275 CuNiTi, lwr. 0.16 x .0275 SST).

Appointment 7: 08/26/2021

Arch Change: (up. 0.18 X .275 TMA, lwr. 0.18 X .0275 CuNiTi). The patient continued to wear the vertical elastics (Figures10a-c).

Figures 10a-c

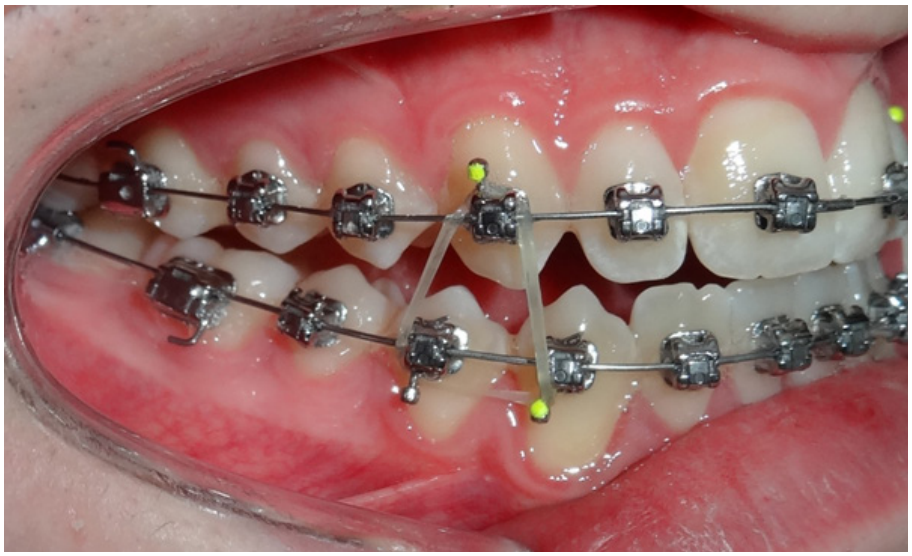


Figure 10a

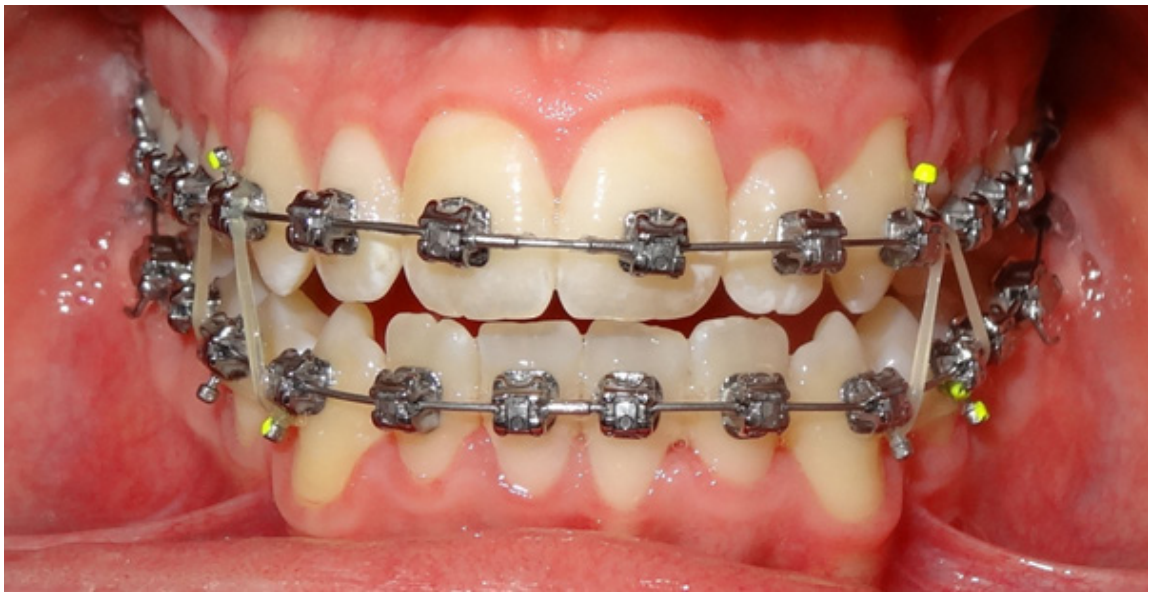


Figure 10b

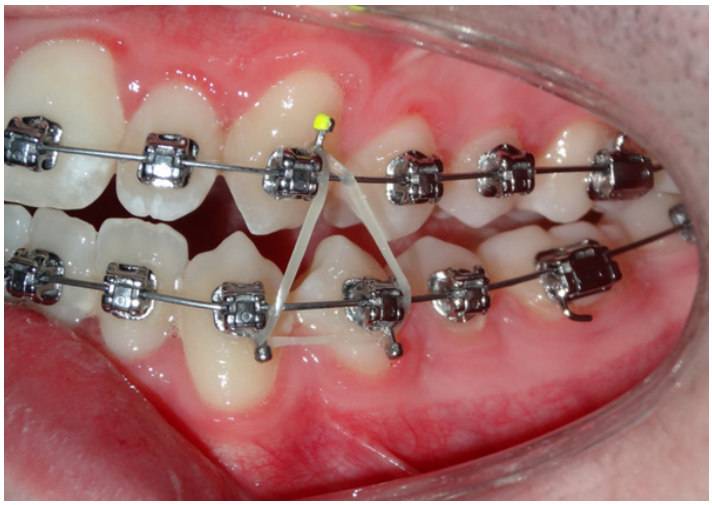
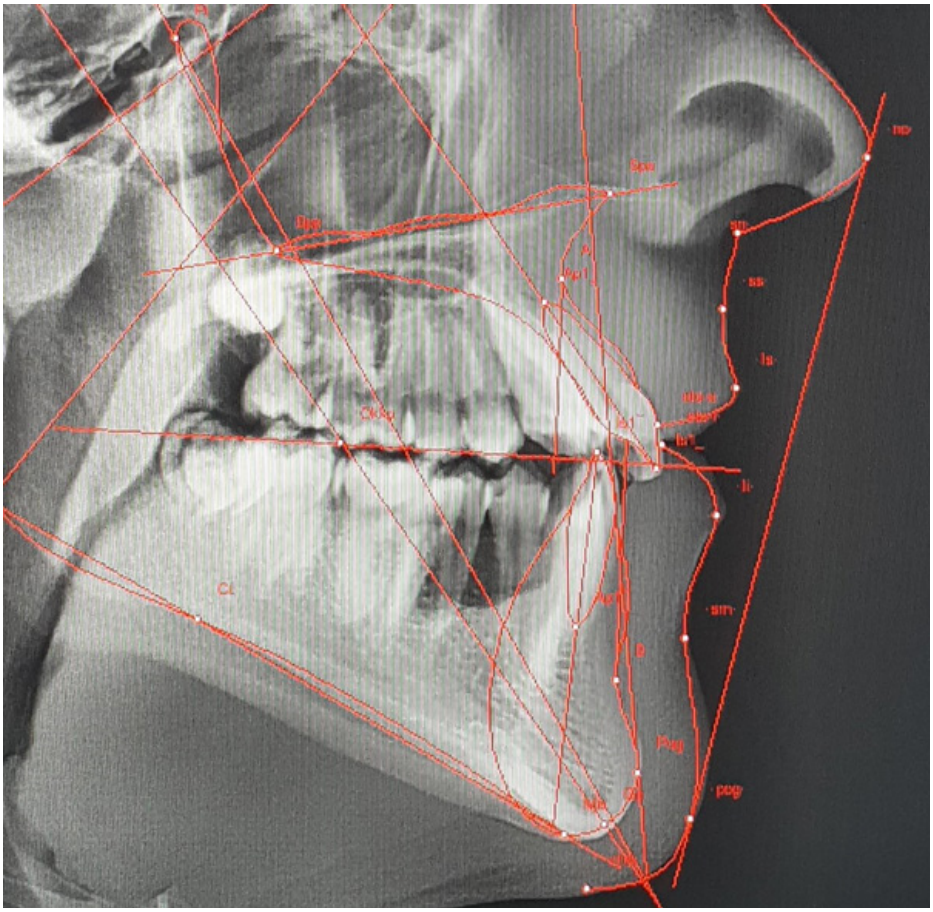


Figure 10c
Figure 10a-c: Vertical Elastics Large (1/8") 3-1/2 Oz

Recordings were carried out for comparison with the initial findings (Figures11a-c).



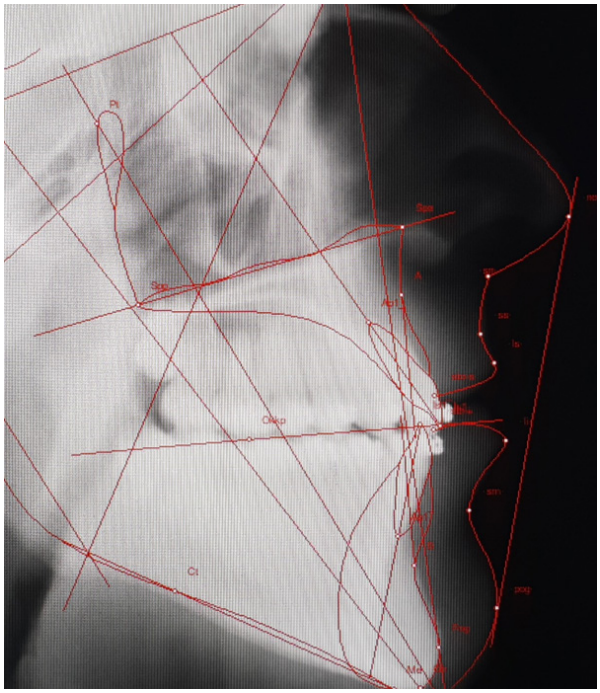
SNA 74,4°

SNB 77,4°

ANB – 3,0°

Wits – 8,5 mm Clase III

Figure 11a



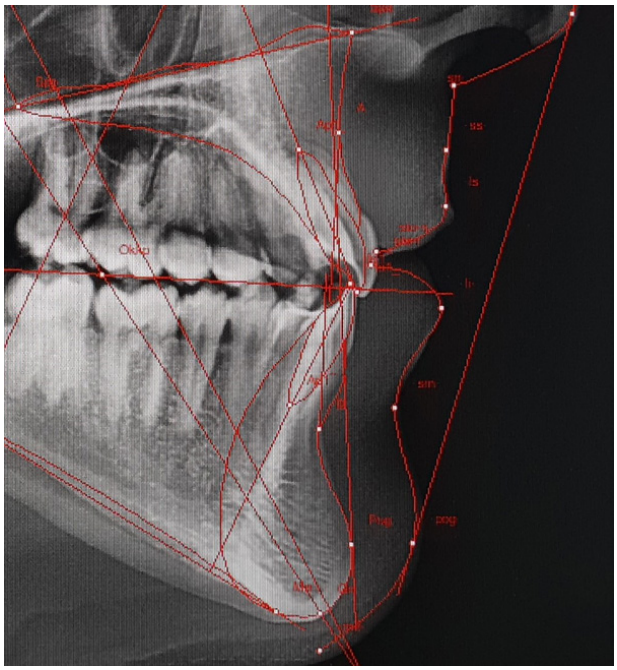
SNA 78,5°

SNB 75,0°

ANB 3,6°

Wits + 2,6 mm

Figure 11b



SNA 78,4°

SNB 75,5°

ANB 2,9°

Wits + 0,7 mm Clase I

Figure 11c

The active treatment phase is over, brackets in the upper jaw and lower jaw are removed, and a permanent lingual retainer is inserted in lower jaw 33-43. After one day, the patient wore a retention splint in the upper jaw and lower jaw.

Completed documents: Models, X-rays and photos were made and evaluated. In Figures 12a-i are the results.

Figure 12a

Figure 12b

Figure 12c

Figure 12d

Figure 12e

Figure 12f

Figure 12g

Figure 12h

Figure 12i

In Figure 13a-c are the cephalometric image with the evaluation and the orthopantomogram.

Figure 13a

	Maxilla			Mandibula		
	SNA Winkel	NS-SPP Winkel	NS-Ba Winkel	SNMeGo Winkel	SNB Winkel	SpP-MeGo (Basisw.)
retrognath	72,0°	18,5°	150,0°	52,0°	70,0°	33,5°
	73,0°	17,5°	148,0°	50,0°	71,0°	32,5°
	74,0°	16,5°	146,0°	48,0°	72,0°	31,5°
	75,0°	15,5°	144,0°	46,0°	73,0°	30,5°
	76,0°	14,5°	142,0°	44,0°	74,0°	29,5°
	77,0°	13,5°	140,0°	42,0°	75,0°	28,5°
	78,0°	12,5°	138,0°	40,0°	76,0°	27,5°
orthognath	79,0°	11,5°	136,0°	38,0°	77,0°	26,5°
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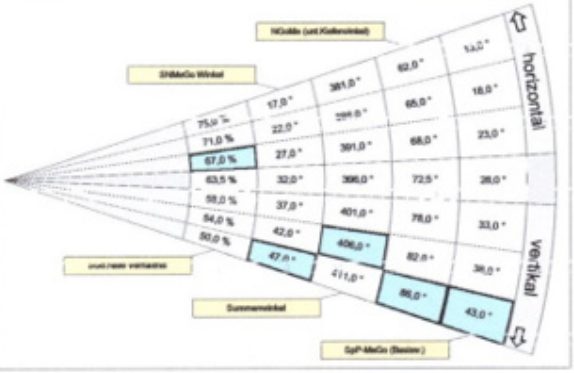
	81,0°	9,5°	132,0°	34,0°	79,0°	24,5°
	82,0°	8,5°	130,0°	32,0°	80,0°	23,5°
	83,0°	7,5°	128,0°	30,0°	81,0°	22,5°
	84,0°	6,5°	126,0°	28,0°	82,0°	21,5°
	85,0°	5,5°	124,0°	26,0°	83,0°	20,5°
prognath	86,0°	4,5°	122,0°	24,0°	84,0°	19,5°
	87,0°	3,5°	120,0°	22,0°	85,0°	18,5°
	88,0°	2,5°	118,0°	20,0°	86,0°	17,5°
	89,0°	1,5°	116,0°	18,0°	87,0°	16,5°
	90,0°	0,5°	114,0°	16,0°	88,0°	15,5°
	91,0°	-0,5°	112,0°	14,0°	89,0°	14,5°
	92,0°	-1,5°	110,0°	12,0°	90,0°	13,5°



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GESICHTSSCHÄDEL					
NSAr (Sella-Winkel)	123,0±5,0 °	160,2 °	+37,2 °		Retrognathie
SArGo (Gelenkwinkel)	143,0±6,0 °	87,9 °	-55,1 °		Progenie-HW
ArGoMe (Kieferwinkel)	130,0±5,0 °	158,6 °	+28,6 °		posteriore Rotation UK
Summenwinkel	396,0±5,0 °	406,7 °	+10,7 °		vertikales Wachstum (OB)
ArGoN (ob.Kieferwinkel)	52,0±2,0 °	62,0 °	+10,0 °		vertikales Wachstum
NGoMe (unt.Kieferwinkel)	72,0±2,0 °	96,6 °	+24,6 °		vertikales Wachstum
KIEFERBASEN					
SNA Winkel	82,0±2,0 °	78,4 °	-3,6 °		Retrognathie OK
SNB Winkel	80,0±2,0 °	75,5 °	-4,5 °		Retrogenie
ANB Winkel	2,0 °	2,9 °	+0,9 °		skel. Klasse II
SNPog Winkel	78,0±2,0 °	77,5 °	-0,5 °		
Facial Axis	90,0±3,0 °	81,9 °	-8,1 °		vertikales Wachstum
Inklinationswinkel	85,0 °	91,7 °	+6,7 °		tiefer Biss
Y-Achse	66,0 °	72,6 °	+6,6 °		Post. Lage UK (VW)
SNMeGo Winkel	32,0 °	46,7 °	+14,7 °		Retroinkl. UK
SpP-MeGo (Basisw.)	25,0±3,0 °	44,0 °	+19,0 °		vertikales Wachstum
VORDERE UND HINTERE GESICHTSANALYSE					
SGo:NMe Verhältnis	63,5±1,5 %	67,1 %	+3,6 %		horizontales Wachstum
DENTO-ALVEOLÄR					
1_-SN Winkel	102,0±2,0 °	96,5 °	-5,5 °		Retrusion OK-Fr.
1¯-MeGo Winkel	90,0±3,0 °	84,5 °	-5,5 °		Retrusion UK-Fr.
Interincisalwinkel	135,0 °	132,3 °	-2,7 °		Spitzfront
1_-NPog Strecke	3,0 mm	2,4 mm	-0,6 mm		Retroposition OK-Fr.
1¯-NPog Strecke	0,0 mm	1,5 mm	+1,5 mm		Anteposition UK-Fr.
Wits	-1,0±1,0 mm	0,7 mm	+1,7 mm		Klasse II
OL-Ästhetik Line	-2,5±0,5 mm	-8,9 mm	-6,4 mm		
UL-Ästhetik Line	-1,0±0,5 mm	-5,4 mm	-4,4 mm		Konvex
Symphyse					

Figure 13b

Figure 13c
Figure 13a-c: Cephalometry: Tracing & Analysis, Orthopantomogram-end of treatment.

Discussion

Alignment, leveling, as well as Class I adjustment took about 15 months of active treatment in this case.

The clinical recordings as well as the cephalometric analyzes show a rapid and big difference between the beginning and the end of the treatment.

The cephalometric values are of greater importance, which can be well observed by comparing the three treatment phases (Figures 11a-c).

Conclusion

The presented case report shows examples of the change in size and shape of the maxillary and mandibular alveolar bone observed in adolescents treated with a passive self-ligating continuous multiband and the Damon Ultima low friction/low force treatment protocol. The Damon Ultima demonstrates precise control of rotation, angulation, and torque with shorter treatment time.

Acknowledgement

None.

Conflict of Interest

No Conflict of interest.