

APPENDIX A

Reliabilities of the Measurements

Table A.1 The Pearson's product moment correlations for the lateral cephalometric measurements and their significant values between the first and the second investigations

variables	r [^]	P-value	variables	r [^]	P-value
SKELETAL			DENTAL		
SNA (deg)	0.998	<0.001***	U1-NA (deg)	0.995	<0.001***
SNB (deg)	0.997	<0.001***	U1-SN (deg)	0.996	<0.001***
ANB (deg)	0.998	<0.001***	L1-NB (deg)	0.996	<0.001***
NSBa (deg)	0.999	<0.001***	L1-GoGn (deg)	0.995	<0.001***
SArGo (deg)	0.999	<0.001***	U1-L1 (deg)	0.993	<0.001***
ArGoGn (deg)	0.998	<0.001***	Overjet (mm)	0.998	<0.001***
NSGn (deg)	0.998	<0.001***	Overbite (mm)	0.998	<0.001***
SN-GoGn (deg)	0.997	<0.001***	L1-APg (mm)	0.995	<0.001***
SN-PP (deg)	0.997	<0.001***	UADH (mm)	0.996	<0.001***
SN-OP (deg)	0.996	<0.001***	UPDH (mm)	0.994	<0.001***
PP-GoGn (deg)	0.997	<0.001***	LADH (mm)	0.997	<0.001***
SN (mm)	0.995	<0.001***	LPDH (mm)	0.998	<0.001***
SBa (mm)	0.998	<0.001***	FACIAL SOFT TISSUE		
ANS-PNS (mm)	0.992	<0.001***	ST facial angle (deg)	0.997	<0.001***
Ar-Go (mm)	0.995	<0.001***	Nasolabial angle (deg)	0.995	<0.001***
Ar-Me (mm)	0.994	<0.001***	Mentolabial angle (deg)	0.994	<0.001***
Go-Gn (mm)	0.996	<0.001***	H angle (deg)	0.996	<0.001***
Wits (mm)	0.994	<0.001***	Nose prominence (mm)	0.997	<0.001***
SW (mm)	0.998	<0.001***	Sup sulcus depth (mm)	0.997	<0.001***
SH (mm)	0.998	<0.001***	Inf sulcus depth (mm)	0.996	<0.001***
UAFH (mm)	0.997	<0.001***	Sn to H-line (mm)	0.996	<0.001***
LAFH (mm)	0.998	<0.001***	Upp lip thickness (mm)	0.996	<0.001***
TAFH (mm)	0.996	<0.001***	Low lip thickness (mm)	0.997	<0.001***
UPFH (mm)	0.997	<0.001***	ST chin thickness (mm)	0.998	<0.001***
LPFH (mm)	0.996	<0.001***	Upp lip to E-line (mm)	0.999	<0.001***
TPFH (mm)	0.997	<0.001***	Low lip to E-line (mm)	0.999	<0.001***

^ Pearson's product moment correlation coefficient

Table A.2 The Pearson's product moment correlations for the model measurements and their significant values between the first and the second investigations

variables	r^{\wedge}	P-value
CWu (mm)	0.998	<0.001***
PWu (mm)	0.999	<0.001***
MWu (mm)	0.997	<0.001***
CDu (mm)	0.999	<0.001***
MDu (mm)	0.999	<0.001***
CWL (mm)	0.999	<0.001***
PWL (mm)	0.998	<0.001***
MWL (mm)	0.998	<0.001***
CDL (mm)	0.997	<0.001***
MDL (mm)	0.998	<0.001***

\wedge Pearson's product moment correlation coefficient

APPENDIX B

Multiple logistic regression analyses for the associations between
type of occlusion and craniofacial measurements

Table B.1 Multiple logistic regression analyses for the associations between
SNB and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		1.32 (1.18, 1.48)	<0.001***
ArGoGn	(deg)	1.31 (1.16, 1.48)	<0.001***
SN	(mm)	1.31 (1.17, 1.47)	<0.001***
SW	(mm)	1.32 (1.18, 1.49)	<0.001***
SH	(mm)	1.32 (1.18, 1.49)	<0.001***
UAFH	(mm)	1.31 (1.16, 1.47)	<0.001***
LPFH	(mm)	1.45 (1.26, 1.67)	<0.001***
U1-NA	(deg)	1.31 (1.15, 1.49)	<0.001***
U1-SN	(deg)	1.24 (1.09, 1.41)	0.001**
L1-NB	(deg)	1.29 (1.15, 1.44)	<0.001***
L1-GoGn	(deg)	1.24 (1.09, 1.42)	0.001**
L1-APg	(mm)	1.31 (1.14, 1.50)	<0.001***
Nasolabial angle	(deg)	1.25 (1.11, 1.41)	<0.001***
H Angle	(deg)	1.28 (1.14, 1.44)	<0.001***
Upp lip to E line	(mm)	1.30 (1.15, 1.47)	<0.001***

[^] Wald's test (** P< 0.01, *** P< 0.001)

Table B.2 Multiple logistic regression analyses for the associations between ArGoGn and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		1.15 (1.07, 1.23)	<0.001***
SNB	(deg)	1.14 (1.06, 1.23)	0.001**
SN	(mm)	1.16 (1.08, 1.24)	<0.001***
SW	(mm)	1.11 (1.03, 1.19)	0.004**
SH	(mm)	1.15 (1.07, 1.24)	<0.001***
UAFH	(mm)	1.15 (1.07, 1.23)	<0.001***
LPFH	(mm)	1.11 (1.03, 1.20)	0.005**
U1-NA	(deg)	1.16 (1.07, 1.26)	<0.001***
U1-SN	(deg)	1.15 (1.07, 1.24)	<0.001***
L1-NB	(deg)	1.14 (1.07, 1.23)	<0.001***
L1-GoGn	(deg)	1.01 (0.92, 1.10)	0.88
L1-APg	(mm)	1.09 (1.00, 1.17)	0.04*
Nasolabial angle	(deg)	1.15 (1.07, 1.24)	<0.001***
H Angle	(deg)	1.14 (1.06, 1.23)	<0.001***
Upp lip to E line	(mm)	1.14 (1.06, 1.22)	<0.001***

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.3 Multiple logistic regression analyses for the associations between SN and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.86 (0.78, 0.95)	<0.001***
SNB	(deg)	0.88 (0.79, 0.98)	0.02
ArGoGn	(deg)	0.85 (0.77, 0.94)	0.002*
SW	(mm)	0.92 (0.83, 1.02)	0.13
SH	(mm)	0.91 (0.81, 1.01)	0.08
UAFH	(mm)	0.88 (0.79, 0.98)	0.02*
LPFH	(mm)	0.91 (0.82, 1.01)	0.08
U1-NA	(deg)	0.82 (0.73, 0.93)	0.001**
U1-SN	(deg)	0.85 (0.76, 0.95)	0.004**
L1-NB	(deg)	0.84 (0.75, 0.93)	0.001**
L1-GoGn	(deg)	0.85 (0.75, 0.96)	0.009**
L1-APg	(mm)	0.85 (0.76, 0.96)	0.008**
Nasolabial angle	(deg)	0.87 (0.79, 0.97)	0.01*
H Angle	(deg)	0.86 (0.77, 0.96)	0.008**
Upp lip to E line	(mm)	0.85 (0.76, 0.95)	0.004**

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.4 Multiple logistic regression analyses for the associations between SW and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.60 (0.47, 0.77)	<0.001***
SNB	(deg)	0.59 (0.46, 0.77)	<0.001***
ArGoGn	(deg)	0.66 (0.52, 0.86)	0.002**
SN	(mm)	0.64 (0.50, 0.83)	0.001**
SH	(mm)	0.64 (0.49, 0.84)	0.001**
UAFH	(mm)	0.62 (0.48, 0.79)	<0.001***
LPFH	(mm)	0.67 (0.51, 0.87)	0.003**
U1-NA	(deg)	0.62 (0.47, 0.81)	<0.001***
U1-SN	(deg)	0.62 (0.48, 0.80)	<0.001***
L1-NB	(deg)	0.55 (0.42, 0.72)	<0.001***
L1-GoGn	(deg)	0.65 (0.49, 0.86)	0.002**
L1-APg	(mm)	0.76 (0.57, 1.00)	0.05
Nasolabial angle	(deg)	0.62 (0.48, 0.80)	<0.001***
H Angle	(deg)	0.56 (0.43, 0.75)	<0.001***
Upp lip to E line	(mm)	0.55 (0.42, 0.73)	<0.001***

[^] Wald's test (** P< 0.01, *** P< 0.001)

Table B.5 Multiple logistic regression analyses for the associations between SH and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.78 (0.66, 0.92)	<0.001***
SNB	(deg)	0.77 (0.65, 0.93)	0.006**
ArGoGn	(deg)	0.77 (0.65, 0.92)	0.003**
SN	(mm)	0.84 (0.70, 1.01)	0.06
SW	(mm)	0.89 (0.75, 1.07)	0.23
UAFH	(mm)	0.81 (0.68, 0.96)	0.02*
LPFH	(mm)	0.87 (0.72, 1.04)	0.13
U1-NA	(deg)	0.84 (0.70, 1.01)	0.06
U1-SN	(deg)	0.80 (0.67, 0.95)	0.01*
L1-NB	(deg)	0.76 (0.64, 0.91)	0.003**
L1-GoGn	(deg)	0.70 (0.56, 0.88)	0.002**
L1-APg	(mm)	0.84 (0.70, 1.02)	0.08
Nasolabial angle	(deg)	0.76 (0.63, 0.91)	0.003**
H Angle	(deg)	0.81 (0.67, 0.97)	0.02*
Upp lip to E line	(mm)	0.76 (0.63, 0.92)	0.004**

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.6 Multiple logistic regression analyses for the associations between UAFH and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.90 (0.82, 0.99)	<0.001***
SNB	(deg)	0.95 (0.85, 1.06)	0.37
ArGoGn	(deg)	0.89 (0.80, 0.98)	0.02*
SN	(mm)	0.94 (0.85, 1.04)	0.23
SW	(mm)	0.94 (0.85, 1.04)	0.28
SH	(mm)	0.94 (0.85, 1.04)	0.27
LPFH	(mm)	0.92 (0.83, 1.02)	0.02*
U1-NA	(deg)	0.92 (0.82, 1.02)	0.12
U1-SN	(deg)	0.93 (0.84, 1.04)	0.22
L1-NB	(deg)	0.91 (0.82, 1.00)	0.06
L1-GoGn	(deg)	0.89 (0.79, 1.00)	0.06
L1-APg	(mm)	0.91 (0.81, 1.03)	0.13
Nasolabial angle	(deg)	0.87 (0.78, 0.97)	0.01*
H Angle	(deg)	0.93 (0.84, 1.04)	0.21
Upp lip to E line	(mm)	0.90 (0.81, 1.00)	0.05

[^] Wald's test (* P< 0.05, *** P< 0.001)

Table B.7 Multiple logistic regression analyses for the associations between LPFH and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.89 (0.83, 0.95)	<0.001***
SNB	(deg)	0.83 (0.76, 0.90)	<0.001***
ArGoGn	(deg)	0.93 (0.86, 0.99)	0.04
SN	(mm)	0.91 (0.85, 0.97)	0.005**
SW	(mm)	0.94 (0.87, 1.01)	0.08
SH	(mm)	0.91 (0.84, 0.98)	0.01*
UAFH	(mm)	0.89 (0.84, 0.96)	0.001**
U1-NA	(deg)	0.89 (0.83, 0.96)	0.003**
U1-SN	(deg)	0.87 (0.81, 0.94)	<0.001***
L1-NB	(deg)	0.87 (0.81, 0.94)	<0.001***
L1-GoGn	(deg)	0.95 (0.87, 1.02)	0.16
L1-APg	(mm)	0.92 (0.85, 0.99)	0.04*
Nasolabial angle	(deg)	0.87 (0.81, 0.93)	<0.001***
H Angle	(deg)	0.89 (0.83, 0.96)	0.002**
Upp lip to E line	(mm)	0.88 (0.82, 0.95)	0.001**

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.8 Multiple logistic regression analyses for the associations between U1-NA and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		1.20 (1.11, 1.29)	<0.001***
SNB	(deg)	1.20 (1.11, 1.30)	<0.001***
ArGoGn	(deg)	1.21 (1.12, 1.31)	<0.001***
SN	(mm)	1.21 (1.13, 1.31)	<0.001***
SW	(mm)	1.19 (1.11, 1.29)	<0.001***
SH	(mm)	1.19 (1.10, 1.27)	<0.001***
UAFH	(mm)	1.20 (1.11, 1.28)	<0.001***
LPFH	(mm)	1.19 (1.11, 1.28)	<0.001***
U1-SN	(deg)	1.23 (1.09, 1.38)	0.001**
L1-NB	(deg)	1.22 (1.13, 1.32)	<0.001***
L1-GoGn	(deg)	1.28 (1.15, 1.14)	<0.001***
L1-APg	(mm)	1.09 (1.00, 1.18)	0.04*
Nasolabial angle	(deg)	1.18 (1.10, 1.28)	<0.001***
H Angle	(deg)	1.16 (1.07, 1.25)	<0.001***
Upp lip to E line	(mm)	1.19 (1.10, 1.28)	<0.001***

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.9 Multiple logistic regression analyses for the associations between U1-SN and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		1.14 (1.07, 1.20)	<0.001***
SNB	(deg)	1.06 (0.99, 1.14)	0.08*
ArGoGn	(deg)	1.14 (1.07, 1.22)	<0.001***
SN	(mm)	1.14 (1.07, 1.21)	<0.001***
SW	(mm)	1.13 (1.06, 1.20)	<0.001***
SH	(mm)	1.13 (1.07, 1.20)	<0.001***
UAFH	(mm)	1.13 (1.06, 1.20)	<0.001***
LPFH	(mm)	1.15 (1.08, 1.23)	<0.001***
U1-NA	(deg)	0.98 (0.88, 1.08)	0.65
L1-NB	(deg)	1.16 (1.09, 1.24)	<0.001***
L1-GoGn	(deg)	1.19 (1.09, 1.29)	<0.001***
L1-APg	(mm)	1.03 (0.96, 1.11)	0.38
Nasolabial angle	(deg)	1.11 (1.04, 1.18)	0.001**
H Angle	(deg)	1.11 (1.04, 1.19)	0.001**
Upp lip to E line	(mm)	1.14 (1.07, 1.22)	<0.001***

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.10 Multiple logistic regression analyses for the associations between L1-NB and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.88 (0.82, 0.94)	<0.001***
SNB	(deg)	0.90 (0.83, 0.97)	0.005**
ArGoGn	(deg)	0.87 (0.81, 0.94)	<0.001***
SN	(mm)	0.86 (0.80, 0.93)	<0.001***
SW	(mm)	0.87 (0.79, 0.94)	<0.001***
SH	(mm)	0.87 (0.81, 0.94)	<0.001***
UAFH	(mm)	0.88 (0.82, 0.94)	<0.001***
LPFH	(mm)	0.87 (0.81, 0.93)	<0.001***
U1-NA	(deg)	0.85 (0.79, 0.93)	<0.001***
U1-SN	(deg)	0.86 (0.79, 0.92)	<0.001***
L1-GoGn	(deg)	1.15 (1.02, 1.29)	0.02*
L1-APg	(mm)	0.54 (0.42, 0.69)	<0.001***
Nasolabial angle	(deg)	0.87 (0.81, 0.94)	0.001**
H Angle	(deg)	0.94 (0.87, 1.02)	0.20
Upp lip to E line	(mm)	0.94 (0.87, 1.02)	0.15

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.11 Multiple logistic regression analyses for the associations between L1-GoGn and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.79 (0.73, 0.86)	<0.001***
SNB	(deg)	0.81 (0.75, 0.88)	<0.001***
ArGoGn	(deg)	0.80 (0.73, 0.87)	<0.001***
SN	(mm)	0.79 (0.73, 0.86)	<0.001***
SW	(mm)	0.80 (0.73, 0.86)	<0.001***
SH	(mm)	0.78 (0.71, 0.85)	<0.001***
UAFH	(mm)	0.79 (0.73, 0.86)	<0.001***
LPFH	(mm)	0.80 (0.74, 0.87)	<0.001***
U1-NA	(deg)	0.75 (0.67, 0.83)	<0.001***
U1-SN	(deg)	0.77 (0.70, 0.84)	<0.001***
L1-NB	(deg)	0.73 (0.65, 0.82)	<0.001***
L1-APg	(mm)	0.72 (0.64, 0.82)	<0.001***
Nasolabial angle	(deg)	0.80 (0.74, 0.87)	<0.001***
H Angle	(deg)	0.82 (0.75, 0.89)	<0.001***
Upp lip to E line	(mm)	0.81 (0.75, 0.88)	<0.001***

[^] Wald's test (*** P< 0.001)

Table B.12 Multiple logistic regression analyses for the associations between L1-APg and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		1.83 (1.49, 2.23)	<0.001***
SNB	(deg)	1.78 (1.44, 2.20)	<0.001***
ArGoGn	(deg)	1.09 (1.00, 1.17)	<0.001***
SN	(mm)	1.86 (1.50, 2.30)	<0.001***
SW	(mm)	1.73 (1.41, 2.12)	<0.001***
SH	(mm)	1.80 (1.47, 2.02)	<0.001***
UAFH	(mm)	1.82 (1.48, 2.23)	<0.001***
LPFH	(mm)	1.78 (1.45, 2.18)	<0.001***
U1-NA	(deg)	1.66 (1.33, 2.06)	<0.001***
U1-SN	(deg)	1.75 (1.40, 2.18)	<0.001***
L1-NB	(deg)	5.53 (2.93, 10.42)	<0.001***
L1-GoGn	(deg)	2.47 (1.74, 3.49)	<0.001***
Nasolabial angle	(deg)	1.77 (1.43, 2.18)	<0.001***
H Angle	(deg)	2.22 (1.67, 2.95)	<0.001***
Upp lip to E line	(mm)	3.02 (2.05, 4.45)	<0.001***

[^] Wald's test (***) P < 0.001

Table B.13 Multiple logistic regression analyses for the associations between nasolabial angle and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.90 (0.87, 0.94)	<0.001***
SNB	(deg)	0.92 (0.88, 0.96)	<0.001***
ArGoGn	(deg)	0.90 (0.86, 0.94)	<0.001***
SN	(mm)	0.90 (0.87, 0.94)	<0.001***
SW	(mm)	0.91 (0.87, 0.95)	<0.001***
SH	(mm)	0.90 (0.86, 0.94)	<0.001***
UAFH	(mm)	0.90 (0.86, 0.94)	<0.001***
LPFH	(mm)	0.89 (0.86, 0.94)	<0.001***
U1-NA	(deg)	0.91 (0.87, 0.95)	<0.001***
U1-SN	(deg)	0.91 (0.87, 0.96)	<0.001***
L1-NB	(deg)	0.90 (0.86, 0.94)	<0.001***
L1-GoGn	(deg)	0.91 (0.87, 0.96)	<0.001***
L1-APg	(mm)	0.91 (0.87, 0.96)	<0.001***
H Angle	(deg)	0.89 (0.84, 0.94)	<0.001***
Upp lip to E line	(mm)	0.89 (0.85, 0.93)	<0.001***

[^] Wald's test (***) P < 0.001

Table B.14 Multiple logistic regression analyses for the associations between H angle and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.75 (0.67, 0.84)	<0.001***
SNB	(deg)	0.76 (0.67, 0.86)	<0.001***
ArGoGn	(deg)	0.75 (0.67, 0.84)	<0.001***
SN	(mm)	0.75 (0.67, 0.84)	<0.001***
SW	(mm)	0.73 (0.65, 0.83)	<0.001***
SH	(mm)	0.76 (0.68, 0.85)	<0.001***
UAFH	(mm)	0.76 (0.68, 0.85)	<0.001***
LPFH	(mm)	0.75 (0.67, 0.84)	<0.001***
U1-NA	(deg)	0.80 (0.72, 0.90)	<0.001***
U1-SN	(deg)	0.77 (0.69, 0.87)	<0.001***
L1-NB	(deg)	0.77 (0.68, 0.87)	<0.001***
L1-GoGn	(deg)	0.82 (0.72, 0.93)	0.003**
L1-APg	(mm)	0.68 (0.58, 0.79)	<0.001***
Nasolabial angle	(deg)	0.74 (0.65, 0.83)	<0.001***
Upp lip to E line	(mm)	0.81 (0.70, 0.93)	0.004*

[^] Wald's test (* P< 0.05, ** P< 0.01, *** P< 0.001)

Table B.15 Multiple logistic regression analyses for the associations between upper lip to E line and type of occlusion, controlling for each potential confounding factor

Confounding Factors		Odds Ratio (95% Conf. Interval)	P-value [^]
		0.63 (0.51, 0.77)	<0.001***
SNB	(deg)	0.64 (0.52, 0.80)	<0.001***
ArGoGn	(deg)	0.83 (0.51, 0.78)	<0.001***
SN	(mm)	0.63 (0.51, 0.77)	<0.001***
SW	(mm)	0.59 (0.47, 0.74)	<0.001***
SH	(mm)	0.63 (0.52, 0.77)	<0.001***
UAFH	(mm)	0.64 (0.53, 0.78)	<0.001***
LPFH	(mm)	0.63 (0.51, 0.77)	<0.001***
U1-NA	(deg)	0.66 (0.53, 0.81)	<0.001***
U1-SN	(deg)	0.63 (0.51, 0.78)	<0.001***
L1-NB	(deg)	0.68 (0.55, 0.84)	<0.001***
L1-GoGn	(deg)	0.72 (0.57, 0.93)	0.01*
L1-APg	(mm)	0.38 (0.26, 0.54)	<0.001***
Nasolabial angle	(deg)	0.60 (0.48, 0.75)	<0.001***
H Angle	(deg)	0.83 (0.64, 1.08)	0.17

[^] Wald's test (* P< 0.05, *** P< 0.001)

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