

APPENDIX A

Data of all variable assessments

Table A.1 Mesiodistal distance (MD) between the first and second premolars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	1.92	2.24	2.48	2.64	3.04
	2	1.76	2.40	2.88	3.20	3.69
	3	1.28	2.01	2.09	2.41	2.56
	4	0.80	0.97	1.45	1.13	0.97
	5	1.45	1.53	2.25	2.42	2.41
	6	2.72	3.52	4.00	4.00	4.48
	7	1.77	1.77	1.93	1.13	1.12
	8	2.24	3.04	2.88	3.36	3.52
	9	2.64	2.88	2.88	1.93	1.61
	10	2.08	2.40	2.56	2.72	2.72
	11	1.20	1.60	1.93	1.92	1.76
	12	1.28	1.52	1.28	1.44	1.76
	13	2.08	2.88	3.04	2.57	2.41
	14	0.96	1.44	2.08	2.41	2.72
	15	1.28	1.77	1.92	2.41	2.25
	16	1.28	1.92	1.92	2.08	2.72
	17	0.24	0.48	0.72	0.48	0.32
	18	2.16	2.72	3.36	3.36	3.36
	19	1.60	1.76	1.76	1.60	1.60
	20	2.32	2.56	2.72	2.48	2.57
	21	1.92	2.08	3.12	2.40	1.60
	22	2.00	2.32	2.64	2.41	2.33
	23	1.28	1.52	1.60	1.44	1.28
	24	0.80	0.64	0.48	0.40	1.28

Table A.1 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	1	1.76	2.40	2.57	2.72	2.74
	2	1.92	2.48	2.40	2.72	2.72
	3	1.36	1.61	2.56	2.88	2.72
	4	2.24	2.56	2.56	2.56	2.72
	5	1.76	2.09	2.98	2.72	3.06
	6	2.32	2.80	3.04	3.52	4.00
	7	0.96	1.20	1.44	1.60	2.41
	8	0.88	1.12	1.68	1.93	2.26
	9	2.24	2.88	3.20	3.44	3.52
	10	1.44	1.76	2.00	1.93	2.26
	11	1.12	1.12	1.20	0.48	0.64
	12	2.57	3.20	3.69	4.03	4.03
	13	1.60	1.92	2.56	2.25	2.42
	14	2.00	2.25	2.88	2.80	2.41
	15	1.28	1.93	2.25	2.42	2.56
	16	1.76	2.08	2.24	2.48	3.36
	17	1.29	1.61	2.10	2.60	3.00
	18	1.60	2.08	2.88	3.36	4.00
	19	1.28	1.44	1.77	2.01	2.25
	20	1.20	0.80	1.28	1.45	1.61
	21	2.08	2.41	2.88	3.04	3.53
	22	1.76	1.68	2.40	2.40	2.56
	23	1.84	2.08	2.24	2.16	2.08
	24	2.72	2.88	3.04	3.85	3.85

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Table A.2 Mesiodistal distance (MD) between the second premolar and the first molar at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	2.00	2.72	3.36	3.84	4.17
	2	2.00	2.56	2.80	3.52	4.01
	3	2.72	3.20	3.36	3.46	3.69
	4	1.44	1.77	1.61	1.93	2.58
	5	2.18	2.49	3.06	3.71	4.05
	6	2.72	3.52	3.52	4.00	4.66
	7	1.28	1.28	1.76	2.40	2.72
	8	2.00	2.40	2.56	3.52	5.12
	9	2.08	3.04	3.12	3.92	6.49
	10	3.04	3.52	4.08	4.24	5.21
	11	2.48	2.88	2.88	2.64	2.58
	12	1.44	1.36	1.28	1.44	1.44
	13	1.60	2.24	2.80	2.96	3.20
	14	2.56	3.12	4.01	4.66	5.00
	15	2.88	3.36	2.88	3.44	4.09
	16	1.76	1.77	1.79	2.45	2.99
	17	1.45	1.61	1.77	2.26	3.39
	18	2.64	2.88	2.88	3.52	4.16
	19	1.76	2.24	2.56	3.20	3.36
	20	2.40	3.04	3.20	4.25	5.82
	21	2.64	3.68	4.00	4.97	6.41
	22	2.96	3.36	3.36	3.60	4.32
	23	2.96	3.20	3.38	3.53	4.33
	24	2.08	1.76	1.76	1.92	2.40
II	1	2.72	3.85	4.51	5.32	5.95
	2	1.60	2.33	2.56	3.04	3.38
	3	2.16	3.20	3.26	2.68	2.73
	4	2.24	3.04	3.36	4.08	5.28
	5	2.09	2.57	2.88	3.52	5.13
	6	1.92	1.84	1.92	2.72	4.00
	7	1.60	1.60	1.60	1.61	1.93
	8	0.96	1.28	1.37	1.37	1.45

Table A.2 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	2.80	3.20	3.28	3.36	4.03
	10	1.76	1.92	2.08	2.57	2.56
	11	1.44	1.44	1.60	1.45	1.77
	12	2.88	4.00	4.24	4.49	5.18
	13	2.72	3.20	3.20	4.00	4.81
	14	2.09	2.25	2.40	2.80	3.52
	15	2.24	3.04	3.53	3.42	3.87
	16	2.56	3.12	3.52	3.68	4.88
	17	1.76	2.40	3.20	4.65	5.53
	18	1.37	1.52	1.04	1.28	2.40
	19	1.28	1.28	1.12	1.12	1.13
	20	1.29	2.09	2.25	2.25	3.06
	21	2.40	3.04	3.04	2.88	3.20
	22	2.40	2.72	3.20	4.00	4.33
	23	2.08	2.17	2.41	2.72	3.04
	24	3.20	4.16	4.00	4.64	7.38

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Table A.3 Mesiodistal distance (MD) between the first and second molars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.96	0.80	0.40	0.80	1.44
	2	0.32	1.04	0.64	1.12	2.64
	3	1.68	2.24	2.24	2.96	3.52
	4	1.12	0.96	0.80	1.28	2.72
	5	1.13	1.13	0.97	1.20	1.77
	6	1.77	2.24	1.76	2.00	2.88
	7	0.96	0.97	0.48	0.66	1.07
	8	1.68	1.52	1.12	1.76	2.96
	9	0.96	1.12	1.16	1.12	1.28
	10	2.08	1.60	0.64	0.48	0.56
	11	2.64	3.36	2.72	2.24	2.24
	12	1.28	1.60	0.80	0.72	1.28
	13	0.74	1.12	0.64	1.12	1.92
	14	1.12	1.12	0.80	0.80	2.88
	15	1.61	2.25	2.24	2.56	2.88
	16	0.96	0.96	0.32	0.40	0.80
	17	1.45	1.45	1.69	2.09	3.36
	18	1.77	1.93	1.60	1.93	3.20
	19	0.66	0.66	0.82	0.96	1.60
	20	1.60	1.92	1.60	2.00	3.20
	21	1.13	1.61	1.45	1.29	0.97
	22	2.48	2.40	1.44	0.80	1.12
	23	2.64	2.72	2.08	1.68	2.24
	24	1.61	1.68	1.28	1.12	1.12
II	1	1.44	1.60	2.40	2.13	1.87
	2	1.20	1.76	1.76	1.76	2.08
	3	0.88	1.29	1.60	1.28	0.80
	4	1.28	2.08	2.33	3.52	5.44
	5	1.77	2.25	2.57	3.52	4.81
	6	1.61	2.25	3.04	2.40	3.60
	7	0.64	0.24	0.16	0.24	0.48
	8	1.76	2.41	1.93	2.40	2.88

Table A.3 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	1.60	1.93	1.44	0.88	1.45
	10	1.44	1.68	1.60	1.60	3.52
	11	2.24	2.48	2.40	3.04	3.36
	12	1.76	2.24	1.20	1.61	2.25
	13	1.92	2.24	2.72	3.06	4.01
	14	1.61	1.76	1.76	1.60	1.84
	15	0.96	1.45	1.61	1.93	2.25
	16	1.76	2.32	2.88	4.00	5.28
	17	1.45	1.45	1.61	3.06	3.38
	18	1.92	2.40	2.48	2.40	2.88
	19	0.64	0.48	0.08	0.08	0.48
	20	1.61	2.24	2.08	2.80	3.52
	21	1.61	1.92	1.60	1.44	1.12
	22	0.96	0.48	0.16	0.48	1.92
	23	1.84	1.44	0.96	1.28	1.92
	24	1.12	1.44	1.20	1.77	1.77

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Table A.4 Mesiodistal distance (MD) between the first and second premolars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	2.24	3.12	4.03	4.11	4.53
	2	2.80	3.84	5.04	6.18	6.91
	3	1.60	2.08	2.41	2.64	3.22
	4	2.00	2.56	2.88	3.22	3.74
	5	2.72	3.28	4.16	4.89	5.45
	6	2.41	2.96	3.36	3.52	4.01
	7	2.98	3.52	4.05	4.98	5.32
	8	2.56	3.36	3.84	4.65	5.14
	9	3.84	4.64	5.29	6.02	6.43
	10	3.76	4.56	5.69	6.50	6.77
	11	2.48	3.04	3.52	3.68	3.84
	12	1.92	1.92	2.40	3.04	4.00
	13	2.56	3.52	4.33	4.19	4.45
	14	2.25	3.04	3.69	4.51	4.87
	15	2.40	2.88	3.53	4.35	4.66
	16	2.24	2.56	2.90	3.39	4.05
	17	2.41	3.20	3.52	4.33	4.97
	18	1.92	2.56	2.88	3.04	3.22
	19	2.48	2.88	3.36	4.00	4.17
	20	2.88	3.52	4.48	4.88	5.37
	21	4.00	5.05	5.77	6.74	7.42
	22	3.38	4.41	5.61	5.94	6.90
	23	2.72	3.68	4.16	4.72	4.96
	24	1.76	2.40	3.04	3.52	4.17
II	1	1.44	1.76	2.26	2.42	2.42
	2	2.64	2.80	3.38	3.55	3.71
	3	2.80	3.69	4.66	5.50	5.50
	4	2.88	3.52	4.32	4.49	5.46
	5	2.80	3.85	4.76	5.28	6.25
	6	2.40	3.04	4.00	4.74	5.50
	7	2.08	2.88	3.52	4.81	5.84
	8	1.52	2.41	2.96	3.28	3.69

Table A.4 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	2.25	3.04	4.00	3.85	3.85
	10	3.04	4.33	5.29	5.94	6.65
	11	2.88	3.60	4.16	4.24	4.66
	12	3.20	3.20	4.16	4.49	5.34
	13	1.60	2.08	2.88	2.88	3.24
	14	2.41	3.14	3.61	3.89	4.05
	15	1.76	3.36	4.01	4.49	4.97
	16	2.56	3.20	3.84	4.01	4.33
	17	2.72	3.69	4.82	5.52	6.25
	18	3.04	3.84	4.32	4.89	4.73
	19	2.25	2.56	3.52	4.48	4.98
	20	1.92	2.72	3.68	4.33	5.30
	21	2.09	2.88	3.68	4.17	4.51
	22	3.68	4.48	5.28	6.74	7.40
	23	2.24	3.24	4.05	5.08	6.06
	24	3.04	3.04	4.00	5.14	5.40

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Table A.5 Mesiodistal distance (MD) between the second premolar and the first molar at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	1.76	1.93	2.25	2.72	3.22
	2	2.08	2.65	2.88	3.53	4.43
	3	2.40	3.00	3.04	3.20	3.68
	4	2.32	2.88	3.38	4.19	5.50
	5	2.40	2.88	3.20	4.00	5.54
	6	2.08	2.88	2.72	2.72	3.39
	7	2.82	2.90	3.08	3.85	4.66
	8	1.76	2.09	2.40	3.12	4.17
	9	2.57	3.20	3.52	4.32	5.13
	10	2.08	2.88	3.36	3.68	4.33
	11	2.72	3.36	3.20	3.20	3.28
	12	1.76	1.76	1.84	1.76	1.93
	13	1.76	2.24	2.90	3.53	3.71
	14	1.93	2.57	3.14	3.63	4.27
	15	1.76	1.96	1.77	1.93	2.01
	16	2.24	2.88	3.52	4.21	5.84
	17	2.41	3.04	3.52	4.17	5.29
	18	2.56	3.20	3.22	3.85	4.51
	19	2.08	2.72	2.90	3.55	4.24
	20	1.76	2.08	2.24	2.57	3.77
	21	3.20	3.76	4.17	4.82	5.48
	22	2.88	3.60	3.93	4.33	5.40
	23	2.24	2.49	2.17	2.33	2.25
	24	1.76	2.08	2.24	2.72	3.36
II	1	1.92	2.88	2.72	2.56	3.22
	2	2.25	2.56	2.56	3.06	3.24
	3	1.76	2.56	3.22	3.53	4.03
	4	2.64	2.88	3.22	3.69	4.71
	5	1.92	2.72	3.06	3.58	4.74
	6	2.00	2.56	2.56	2.88	3.53
	7	2.72	2.72	3.04	3.84	4.51
	8	1.44	2.08	2.72	3.04	3.68

Table A.5 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	2.40	3.20	3.36	3.85	4.03
	10	2.08	2.56	2.72	2.72	3.36
	11	2.56	3.04	3.63	4.35	5.64
	12	3.04	4.00	4.82	5.08	6.02
	13	1.52	1.76	1.76	1.92	2.41
	14	1.77	1.85	1.93	2.57	3.06
	15	1.76	2.40	2.40	2.72	3.20
	16	2.40	3.04	3.44	3.69	4.98
	17	1.44	2.25	2.42	3.06	3.74
	18	2.00	2.48	2.88	3.36	4.64
	19	2.16	2.16	1.93	2.72	3.69
	20	1.60	1.76	2.40	2.64	4.00
	21	1.92	2.08	1.92	1.76	2.41
	22	2.41	2.80	3.04	2.90	3.38
	23	1.92	2.41	2.88	3.38	4.35
	24	3.20	4.00	4.64	5.28	5.94

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Table A.6 Mesiodistal distance (MD) between the first and second molars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	3.04	3.60	4.16	4.48	6.08
	2	2.40	2.80	3.22	3.68	4.49
	3	2.08	1.76	2.08	2.09	2.50
	4	1.76	2.09	1.82	3.22	5.36
	5	3.36	3.68	3.85	4.87	6.47
	6	3.52	4.32	4.80	5.60	6.91
	7	3.92	4.00	4.96	5.60	6.57
	8	2.08	2.41	2.45	3.55	6.03
	9	2.08	2.25	2.25	2.72	3.85
	10	2.88	3.04	3.04	3.68	4.80
	11	2.72	2.72	2.72	2.41	2.72
	12	1.60	1.60	1.60	1.60	2.40
	13	3.20	3.84	4.73	5.94	7.40
	14	2.64	3.52	3.53	4.03	4.82
	15	1.60	2.24	2.40	2.41	3.06
	16	2.08	2.56	3.11	4.15	6.38
	17	2.48	2.96	3.20	4.33	5.82
	18	3.04	3.68	4.01	4.49	5.94
	19	2.92	3.55	4.05	4.66	5.78
	20	2.08	2.48	2.56	3.36	5.62
	21	2.56	2.96	3.22	4.03	4.68
	22	3.20	3.20	3.92	4.81	6.57
	23	3.04	3.68	3.06	2.92	3.39
	24	2.08	2.40	2.40	2.72	3.36
II	1	2.72	3.39	3.58	3.80	3.30
	2	2.88	3.36	3.52	3.24	4.00
	3	2.32	3.38	3.22	2.42	2.60
	4	2.56	2.90	3.14	4.31	5.41
	5	2.64	3.22	4.13	4.66	5.67
	6	2.56	3.52	4.08	4.33	5.48
	7	1.28	1.04	0.64	0.80	1.36
	8	2.40	2.32	2.57	2.72	3.85

Table A.6 (continued)

Skeletal pattern	Subject	Mesiodistal distance (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	3.04	3.61	3.69	4.08	4.46
	10	2.00	2.08	1.92	2.24	2.24
	11	1.93	1.77	2.09	2.92	4.05
	12	3.52	4.56	5.24	7.49	7.49
	13	2.48	3.20	3.52	3.69	4.37
	14	2.74	3.20	3.28	3.30	3.92
	15	2.24	3.04	3.20	3.20	3.68
	16	2.57	2.72	3.04	3.39	4.55
	17	3.20	3.69	4.46	5.12	6.68
	18	2.08	2.80	2.88	3.04	3.52
	19	1.44	0.96	0.64	0.64	0.96
	20	2.88	3.44	3.38	3.32	4.01
	21	2.24	3.20	3.58	3.14	2.84
	22	2.40	3.52	3.87	4.89	7.16
	23	3.20	3.68	3.69	4.41	5.66
	24	3.36	4.49	5.00	7.81	7.81

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Table A.7 Buccolingual alveolar process width (BL) between the first and second premolars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	7.36	10.56	10.88	10.59	11.08
	2	10.09	11.84	11.54	11.06	12.21
	3	8.17	9.29	9.93	9.62	9.63
	4	7.36	9.82	10.32	9.89	9.29
	5	6.27	9.65	10.42	10.30	10.46
	6	8.97	10.24	9.92	9.72	9.29
	7	9.40	10.92	11.06	10.89	10.58
	8	8.64	10.88	11.20	10.73	10.41
	9	11.36	11.84	11.85	12.17	13.14
	10	6.72	10.88	11.92	12.41	13.62
	11	8.97	10.88	9.93	9.77	10.40
	12	3.84	8.64	9.60	9.28	9.45
	13	5.92	9.30	10.26	9.95	11.39
	14	10.08	11.28	11.37	11.38	13.00
	15	8.49	9.61	9.29	8.65	8.49
	16	7.68	9.76	9.77	10.58	11.07
	17	7.36	10.08	10.57	10.25	10.89
	18	8.48	10.88	10.88	10.56	10.41
	19	10.08	10.72	10.72	10.40	12.48
	20	8.32	10.88	10.88	10.64	11.20
	21	9.44	10.72	11.68	11.84	11.84
	22	8.80	12.08	12.65	12.81	14.41
	23	9.29	10.80	10.24	9.60	10.56
	24	4.80	8.48	10.08	10.40	10.72
II	1	6.40	10.88	12.33	12.34	11.57
	2	7.20	10.16	10.40	9.76	9.44
	3	5.60	9.65	9.77	9.77	11.08
	4	7.04	9.12	8.80	8.65	8.00
	5	8.64	11.24	12.55	12.70	12.05
	6	8.16	10.41	10.72	10.88	12.97
	7	7.68	10.56	10.40	11.20	11.87
	8	6.72	9.61	10.88	10.27	10.68

Table A.7 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	7.20	9.61	10.09	10.57	9.94
	10	7.68	10.72	11.84	12.66	13.49
	11	9.12	10.41	10.96	12.96	15.84
	12	8.49	8.65	9.63	10.75	13.26
	13	5.92	9.77	11.68	12.17	12.56
	14	4.48	8.65	10.10	9.37	9.13
	15	7.20	9.95	9.81	9.67	10.76
	16	6.24	8.48	9.13	8.80	8.97
	17	6.74	11.10	12.26	12.84	12.81
	18	6.40	9.93	10.89	11.38	12.67
	19	7.68	9.62	10.09	9.94	11.24
	20	4.96	9.13	10.24	10.72	11.72
	21	6.88	9.61	10.26	10.41	10.11
	22	7.20	10.56	11.20	11.20	12.49
	23	9.12	9.60	10.08	11.84	12.96
	24	8.16	9.13	9.44	10.40	12.84

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Table A.8 Buccolingual alveolar process width (BL) between the second premolar and first molars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	8.32	12.03	13.47	13.63	14.46
	2	9.60	12.80	13.69	14.59	14.92
	3	9.12	11.05	10.42	10.10	11.41
	4	10.24	12.04	12.52	11.73	12.74
	5	10.64	11.31	11.75	12.42	13.76
	6	11.52	13.60	12.81	11.38	11.57
	7	11.30	12.20	13.30	12.97	13.61
	8	9.93	12.48	12.96	12.97	13.30
	9	11.84	12.97	13.94	15.69	17.00
	10	9.44	12.48	13.60	14.25	16.02
	11	10.24	11.52	10.89	11.56	13.54
	12	8.00	10.88	11.04	10.72	11.37
	13	8.84	10.72	12.96	13.29	14.25
	14	9.84	12.97	13.16	14.06	14.84
	15	8.96	11.20	10.40	10.56	11.88
	16	8.96	11.75	12.71	13.24	13.70
	17	9.63	11.56	11.41	12.11	12.92
	18	11.04	14.09	13.45	12.34	12.03
	19	11.36	12.48	12.64	12.64	13.92
	20	11.20	12.66	12.82	13.17	13.85
	21	6.40	12.32	13.29	15.22	17.31
	22	9.76	13.44	14.56	15.37	16.35
	23	10.26	11.55	10.78	11.56	12.85
	24	6.24	10.08	11.20	11.92	12.16
II	1	6.24	11.22	14.78	16.10	16.56
	2	8.16	11.93	12.81	12.20	11.80
	3	11.36	12.48	12.99	13.01	13.64
	4	6.56	9.76	10.08	9.13	9.78
	5	8.96	12.49	13.14	13.78	14.59
	6	11.52	13.04	13.28	14.89	15.87
	7	8.16	11.68	12.80	13.63	15.34
	8	6.27	10.76	12.52	13.47	14.62

Table A.8 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	8.50	10.09	10.40	10.57	11.61
	10	10.40	12.80	14.56	16.01	16.36
	11	10.57	11.84	13.14	15.06	16.05
	12	9.44	11.86	12.35	14.12	17.99
	13	4.64	10.72	12.80	14.41	15.39
	14	7.20	12.01	13.20	12.97	12.98
	15	9.12	13.14	13.16	13.58	15.30
	16	8.64	10.72	10.88	11.20	11.38
	17	8.17	11.85	12.97	13.93	14.58
	18	11.85	12.16	12.80	14.08	14.72
	19	7.85	11.68	11.36	11.53	13.98
	20	5.44	9.97	11.54	12.98	15.02
	21	8.32	11.04	11.04	11.20	11.54
	22	10.24	13.28	14.09	14.57	16.98
	23	9.76	11.20	12.48	13.62	15.06
	24	10.24	10.40	11.68	13.46	18.14

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Table A.9 Buccolingual alveolar process width (BL) between the first and second molars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	13.49	16.64	17.12	16.64	16.32
	2	10.42	14.41	15.22	15.37	15.85
	3	13.76	14.56	13.92	14.88	15.04
	4	11.52	14.43	14.88	15.84	16.80
	5	10.14	14.12	14.82	14.84	14.63
	6	17.78	17.12	15.85	14.40	13.93
	7	14.08	14.30	14.37	15.39	15.78
	8	13.44	15.04	14.56	14.64	14.08
	9	14.09	14.16	14.25	14.65	16.32
	10	12.41	14.08	14.72	16.00	14.72
	11	12.83	15.53	15.21	15.85	16.88
	12	7.68	12.00	14.80	14.40	15.68
	13	12.37	17.13	17.45	16.80	16.01
	14	14.57	16.08	16.45	17.44	18.88
	15	12.49	14.41	13.76	14.88	15.20
	16	9.61	13.93	14.59	16.65	16.64
	17	11.56	13.17	14.63	14.67	15.22
	18	17.44	18.25	16.96	16.49	15.38
	19	12.40	13.01	13.71	14.12	14.73
	20	14.08	15.20	14.40	14.56	14.57
	21	13.65	13.95	13.77	13.77	14.71
	22	12.64	14.72	15.92	15.44	15.52
	23	15.04	16.00	14.72	15.36	16.00
	24	6.90	12.00	14.24	15.36	15.84
II	1	11.36	18.40	19.20	19.17	19.19
	2	11.52	16.48	16.48	15.68	16.64
	3	11.69	16.72	16.01	15.87	16.19
	4	10.56	12.80	13.93	14.73	15.38
	5	12.74	15.88	17.15	16.52	15.86
	6	13.01	14.01	14.40	15.20	16.16
	7	10.51	15.87	16.09	16.81	19.56
	8	9.29	12.83	14.91	14.73	16.49

Table A.9 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	10.40	12.64	13.44	13.45	12.67
	10	11.37	14.40	15.52	15.20	16.48
	11	12.32	14.88	14.40	15.04	16.32
	12	12.32	14.09	15.05	15.56	20.38
	13	6.24	13.77	16.36	18.82	19.40
	14	8.17	14.89	15.52	15.44	16.32
	15	13.60	15.71	15.87	15.87	16.82
	16	9.28	12.64	13.92	13.60	13.44
	17	13.00	15.09	16.36	16.88	16.37
	18	14.24	15.44	15.52	15.68	16.40
	19	12.37	15.21	16.00	16.65	17.92
	20	11.87	12.65	13.92	14.08	16.80
	21	12.35	13.92	14.40	13.77	13.76
	22	11.36	14.81	16.32	16.16	17.28
	23	12.80	14.72	14.88	15.84	19.20
	24	12.80	14.09	14.88	15.21	16.37

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Table A.10 Buccolingual alveolar process width (BL) between the first and second premolars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	5.12	8.66	9.84	10.82	12.29
	2	7.45	8.64	10.18	11.40	12.39
	3	7.20	9.44	10.56	10.75	10.30
	4	7.04	7.38	9.31	9.82	10.23
	5	6.40	7.68	9.61	10.09	10.91
	6	11.22	14.88	14.89	13.46	11.72
	7	8.14	8.81	9.17	9.65	10.46
	8	9.12	12.00	13.14	12.84	12.72
	9	5.60	9.12	10.26	11.72	12.72
	10	6.72	9.45	11.39	13.01	13.58
	11	7.52	8.32	8.65	9.44	10.09
	12	1.44	7.36	8.16	8.64	9.60
	13	7.36	9.29	10.25	11.42	12.60
	14	6.89	9.53	10.43	11.41	11.95
	15	6.56	8.97	10.26	10.13	10.13
	16	6.88	8.33	9.03	9.51	10.51
	17	6.56	8.65	8.98	9.62	10.11
	18	10.72	14.08	12.96	10.74	9.98
	19	8.08	8.80	10.08	10.41	9.80
	20	7.68	10.72	11.36	11.52	12.18
	21	6.73	8.33	9.62	11.24	12.26
	22	6.09	8.65	10.25	12.19	12.69
	23	8.00	8.16	8.16	8.80	9.20
	24	5.44	7.52	8.32	9.44	9.77
II	1	4.00	7.36	14.17	14.95	14.55
	2	5.94	10.25	11.24	11.85	12.11
	3	7.68	9.19	10.44	10.84	11.71
	4	4.64	7.36	7.68	7.85	8.38
	5	5.61	10.46	12.29	12.34	12.46
	6	8.16	12.01	14.10	14.31	14.05
	7	6.24	8.00	10.09	11.24	11.02
	8	4.32	9.13	8.81	8.49	8.68

Table A.10 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	5.29	9.78	10.74	10.92	11.10
	10	6.72	7.70	8.66	9.31	10.21
	11	7.53	9.60	11.37	11.70	11.72
	12	6.57	7.06	7.55	7.39	7.13
	13	5.28	6.88	12.96	13.81	13.58
	14	5.77	8.11	9.31	9.87	10.32
	15	7.68	9.76	10.26	10.43	10.74
	16	5.44	6.40	6.88	7.69	8.34
	17	5.77	8.52	11.26	11.68	11.77
	18	8.64	11.36	12.97	12.82	13.14
	19	4.97	8.49	9.77	9.93	9.97
	20	3.84	8.00	8.80	8.81	8.69
	21	6.56	11.44	12.02	11.73	11.72
	22	6.72	8.00	8.48	9.13	9.82
	23	9.29	10.82	11.55	11.64	11.14
	24	6.09	6.88	6.97	6.74	6.75

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Table A.11 Buccolingual alveolar process width (BL) between the second premolar and the first molar at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	8.80	10.73	11.38	13.02	13.99
	2	9.61	10.09	11.38	12.07	13.20
	3	9.12	10.08	12.01	12.35	11.56
	4	8.16	9.14	10.46	11.27	12.15
	5	5.76	9.45	11.85	12.81	13.63
	6	9.60	13.13	14.57	14.59	13.71
	7	9.89	10.13	11.27	11.89	12.20
	8	10.41	12.51	14.42	14.93	15.09
	9	7.52	9.85	11.70	13.95	15.00
	10	8.96	10.41	12.33	13.30	14.49
	11	10.08	11.04	11.36	11.52	11.85
	12	4.16	9.12	9.60	9.93	10.09
	13	9.12	11.12	12.19	13.33	14.37
	14	8.00	10.41	11.39	11.57	12.39
	15	8.80	9.77	11.54	12.20	11.91
	16	8.48	9.44	10.57	11.61	12.49
	17	7.72	10.24	11.52	12.19	13.15
	18	9.92	13.77	14.28	14.15	13.18
	19	9.44	9.95	10.64	11.29	11.55
	20	9.52	11.52	14.00	14.89	15.38
	21	7.20	9.45	10.75	13.33	14.65
	22	10.56	12.16	13.62	14.28	14.63
	23	6.56	10.40	10.10	10.48	11.54
	24	6.88	8.80	9.12	9.37	9.77
II	1	5.44	12.80	14.40	14.91	15.13
	2	5.45	9.77	11.08	12.07	12.76
	3	9.76	11.21	13.01	13.68	14.19
	4	7.38	8.01	9.00	9.63	9.68
	5	9.45	10.28	11.77	12.97	14.06
	6	9.29	11.85	14.17	15.40	15.25
	7	8.80	9.60	10.72	11.69	11.91
	8	8.49	10.72	10.89	11.21	11.71

Table A.11 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	8.65	11.05	11.22	11.41	11.43
	10	8.32	9.92	11.60	12.16	12.80
	11	8.33	9.62	11.27	12.70	13.22
	12	8.01	8.19	7.88	7.24	6.97
	13	5.60	8.96	12.80	14.08	14.44
	14	6.08	10.09	10.25	10.83	10.99
	15	11.56	10.88	11.84	12.48	12.96
	16	5.28	8.00	8.48	9.45	10.27
	17	8.00	9.30	10.44	11.75	12.94
	18	8.64	10.24	12.81	14.41	14.57
	19	8.16	9.61	10.73	11.21	10.98
	20	5.28	9.93	10.40	11.22	11.55
	21	6.88	11.36	11.68	11.69	11.65
	22	8.65	8.82	9.94	10.60	11.72
	23	8.40	10.41	11.70	12.19	12.39
	24	7.36	7.68	7.68	7.69	7.87

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Table A.12 Buccolingual alveolar process width (BL) between the first and second molars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	10.56	12.64	14.40	16.48	18.42
	2	8.00	11.85	13.02	14.58	15.52
	3	9.12	10.40	12.00	12.67	12.86
	4	10.40	12.04	13.28	14.44	15.68
	5	11.70	16.52	19.14	19.78	19.44
	6	5.76	15.36	16.34	14.73	12.55
	7	12.24	13.28	13.87	14.03	13.63
	8	10.08	13.00	14.78	15.80	16.47
	9	13.60	15.87	17.64	18.15	17.91
	10	12.17	15.05	17.47	17.63	17.95
	11	12.80	14.08	15.36	16.41	16.33
	12	6.40	9.92	11.20	11.76	12.33
	13	10.72	14.26	16.53	18.48	19.65
	14	9.85	10.89	12.39	12.56	13.02
	15	8.16	10.24	11.84	12.19	13.20
	16	9.60	12.96	14.42	15.65	16.05
	17	10.08	13.44	15.85	17.48	18.04
	18	10.56	15.55	16.35	14.75	12.21
	19	9.92	12.90	14.02	14.40	13.94
	20	9.44	12.16	14.40	16.32	16.84
	21	14.59	17.16	17.98	18.34	16.95
	22	14.89	18.27	19.20	18.90	16.84
	23	11.84	13.14	13.98	15.48	15.73
	24	8.16	9.76	11.20	12.80	12.65
II	1	6.40	12.26	14.60	14.90	15.27
	2	10.56	11.20	12.16	13.08	14.28
	3	12.32	14.14	15.44	16.31	16.34
	4	8.48	9.81	11.30	12.88	14.88
	5	11.06	12.37	15.10	16.61	17.52
	6	11.52	14.41	15.86	16.41	16.61
	7	9.60	11.20	13.31	14.50	15.36
	8	12.00	12.17	13.14	13.79	14.27

Table A.12 (continued)

Skeletal pattern	Subject	Buccolingual alveolar process width (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	10.08	11.73	13.18	14.28	14.55
	10	10.56	12.96	14.88	15.20	14.88
	11	9.63	12.39	14.35	15.70	16.16
	12	8.64	9.93	10.80	11.99	11.39
	13	7.52	11.54	12.97	14.14	14.57
	14	8.95	10.50	11.29	11.89	13.09
	15	11.20	12.96	14.72	16.00	16.02
	16	6.24	9.93	12.19	14.31	15.70
	17	11.36	12.18	15.41	16.88	18.18
	18	10.24	12.64	14.72	15.37	16.33
	19	9.76	10.72	12.32	13.12	13.76
	20	9.44	11.21	12.85	13.71	14.30
	21	10.40	11.38	12.42	13.19	14.40
	22	10.08	12.02	13.98	14.50	14.69
	23	10.56	12.97	14.27	15.08	14.01
	24	9.76	11.08	12.72	12.92	10.79

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Table A.13 Buccal cortical bone thickness (BC) between the first and second premolars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.72	0.80	1.28	1.45	1.77
	2	0.40	0.48	0.72	0.82	0.97
	3	0.96	0.72	0.96	0.96	1.29
	4	0.64	0.64	0.74	0.66	0.66
	5	0.56	0.72	1.28	1.28	1.45
	6	0.64	1.12	1.28	1.36	1.60
	7	0.82	1.28	1.28	0.96	0.97
	8	0.88	1.93	1.77	1.37	1.60
	9	0.80	0.80	0.88	0.80	1.21
	10	0.72	1.12	1.28	0.72	0.96
	11	1.52	0.96	1.28	1.20	1.28
	12	0.90	0.96	1.28	1.36	1.12
	13	0.50	0.40	0.97	0.97	1.13
	14	0.56	0.64	0.64	0.56	1.21
	15	0.72	0.88	0.80	0.80	1.44
	16	0.64	0.56	0.48	0.88	0.88
	17	0.56	1.04	1.28	1.20	1.28
	18	0.88	1.44	1.92	2.24	1.92
	19	1.12	1.12	1.12	0.96	0.96
	20	0.96	1.28	1.44	1.36	1.44
	21	0.72	1.04	0.56	0.56	0.56
	22	0.80	1.36	1.36	0.88	0.88
	23	0.80	1.28	1.04	0.96	1.76
	24	0.48	0.96	1.12	1.36	1.20
II	1	0.50	1.28	1.77	1.77	1.13
	2	0.64	1.20	1.28	0.80	0.80
	3	0.72	1.69	1.04	1.79	1.53
	4	0.80	1.04	1.28	1.20	1.36
	5	0.58	1.77	1.87	1.79	1.93
	6	0.80	1.61	1.12	0.96	1.28
	7	0.50	0.40	0.64	0.64	0.97
	8	0.45	0.68	1.04	1.13	1.77

Table A.13 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	0.80	0.80	1.28	1.52	1.28
	10	0.64	0.96	0.64	0.96	1.48
	11	0.68	0.64	0.64	1.2	1.92
	12	0.64	0.72	0.96	1.13	1.24
	13	0.72	1.29	2.00	1.60	1.71
	14	0.80	0.97	0.97	0.64	1.45
	15	0.60	1.21	1.13	2.40	1.24
	16	0.80	1.12	0.88	0.88	1.52
	17	0.64	1.29	1.79	1.63	1.48
	18	0.48	0.72	1.04	1.12	1.13
	19	0.40	0.40	0.88	0.96	0.96
	20	0.58	0.97	1.12	1.20	1.44
	21	0.85	1.29	1.29	1.60	1.53
	22	0.40	0.64	0.88	1.12	1.53
	23	0.53	0.64	0.80	0.96	1.28
	24	0.80	1.04	1.12	0.96	0.97

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Table A.14 Buccal cortical bone thickness (BC) between the second premolar and the first molar at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.64	0.82	0.80	1.04	1.29
	2	0.72	0.56	0.80	0.89	0.90
	3	0.80	1.04	0.97	0.89	1.13
	4	0.64	0.64	0.56	0.82	0.66
	5	0.48	0.56	0.82	1.13	1.40
	6	0.96	1.60	1.60	0.80	0.97
	7	1.16	1.28	1.44	0.96	0.82
	8	1.28	1.28	1.28	1.12	1.44
	9	0.56	0.96	1.45	1.61	2.64
	10	0.72	0.64	1.29	1.13	0.96
	11	1.68	1.04	0.96	0.82	1.61
	12	0.48	0.72	1.20	1.04	0.80
	13	0.51	0.72	0.82	0.72	1.12
	14	0.64	0.56	0.56	0.56	0.48
	15	0.80	0.80	0.64	0.80	1.37
	16	0.80	0.90	0.82	0.82	0.93
	17	0.66	0.96	1.13	1.32	1.45
	18	0.97	1.12	2.09	1.04	1.29
	19	0.96	1.28	0.80	0.80	0.80
	20	1.28	1.44	1.21	1.29	1.29
	21	0.72	0.88	0.96	1.61	1.77
	22	0.56	0.88	1.20	1.28	1.20
	23	1.28	0.97	0.96	0.82	1.16
	24	0.80	1.20	1.12	0.96	0.88
II	1	0.51	0.96	1.93	1.48	1.63
	2	0.80	0.97	0.88	1.05	1.05
	3	0.93	1.44	1.32	1.16	1.15
	4	0.80	1.12	0.96	0.80	0.80
	5	0.80	1.12	1.52	1.61	1.05
	6	0.96	1.12	1.60	1.85	1.29
	7	0.36	0.40	0.56	0.64	1.13
	8	0.51	1.02	1.12	1.20	1.28

Table A.14 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	0.72	1.52	1.60	1.60	1.29
	10	0.58	0.80	0.96	0.96	1.28
	11	0.72	0.64	0.80	1.12	1.45
	12	0.48	0.97	0.80	1.21	0.66
	13	0.93	1.02	1.44	1.45	1.61
	14	0.48	1.44	1.04	1.28	0.97
	15	0.72	1.13	1.05	1.16	1.15
	16	0.72	0.80	0.64	0.96	1.29
	17	0.64	0.96	1.60	1.28	0.90
	18	0.56	1.44	1.60	1.28	0.88
	19	0.53	0.48	0.48	0.96	0.82
	20	0.72	0.96	1.45	1.61	2.03
	21	0.85	1.28	1.28	1.37	1.29
	22	0.48	0.48	0.88	1.12	0.82
	23	0.58	0.64	1.12	0.80	1.13
	24	0.88	0.80	0.72	0.96	0.72

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Table A.15 Buccal cortical bone thickness (BC) between the first and second molars at different vertical heights from the CEJ of the maxilla in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.43	0.80	0.80	1.28	2.08
	2	0.16	0.64	0.48	0.48	0.56
	3	0.64	1.04	1.36	1.12	1.44
	4	0.68	0.80	0.80	0.80	1.12
	5	0.48	1.29	1.13	1.13	1.61
	6	1.29	1.76	1.77	1.52	2.25
	7	1.60	1.28	1.29	1.13	1.37
	8	1.68	1.84	1.28	2.08	2.24
	9	0.88	0.96	1.28	2.32	1.20
	10	0.88	0.96	0.56	1.20	1.20
	11	1.77	1.61	1.20	1.12	1.44
	12	0.80	1.20	1.68	1.28	1.28
	13	0.66	1.12	0.64	1.04	1.76
	14	0.56	0.40	0.32	0.48	0.24
	15	0.51	0.56	0.96	0.96	1.44
	16	0.80	0.80	0.80	0.80	0.96
	17	0.64	0.96	0.97	1.45	1.77
	18	0.36	1.28	1.44	2.08	1.61
	19	0.96	1.12	1.12	1.28	1.28
	20	0.56	1.44	1.44	1.44	1.76
	21	0.64	0.72	1.04	1.61	0.72
	22	0.80	0.88	0.96	0.96	1.04
	23	1.12	1.28	1.28	1.28	1.44
	24	0.58	1.12	1.20	0.96	1.28
II	1	0.86	1.28	1.36	1.40	1.44
	2	0.96	0.96	1.20	1.12	1.28
	3	0.82	1.93	1.12	1.29	1.45
	4	0.58	0.72	0.88	1.29	1.20
	5	0.82	1.45	0.80	1.21	1.28
	6	0.48	0.97	1.12	1.20	1.12
	7	0.45	0.72	0.64	0.48	0.64
	8	0.72	1.85	1.93	2.01	2.56

Table A.15 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	0.86	1.44	1.60	1.44	1.45
	10	0.48	0.64	0.64	0.80	0.96
	11	0.72	1.37	0.96	1.20	1.68
	12	0.80	0.88	1.45	1.36	1.45
	13	0.58	1.04	1.53	0.97	1.45
	14	1.01	1.36	0.80	0.80	0.96
	15	0.72	1.61	1.52	1.36	1.12
	16	0.50	0.48	0.96	1.20	1.44
	17	0.48	1.04	1.04	0.48	0.80
	18	1.12	1.92	1.28	1.68	1.68
	19	0.45	0.64	0.48	0.56	0.64
	20	0.80	1.12	1.20	1.60	2.24
	21	0.97	1.68	1.60	1.44	1.76
	22	0.58	0.48	1.04	0.96	0.80
	23	1.28	0.88	1.04	1.28	1.60
	24	0.64	0.64	0.88	1.20	1.29

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Table A.16 Buccal cortical bone thickness (BC) between the first and second premolars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.64	1.53	1.87	2.10	2.45
	2	0.56	0.96	0.72	1.21	1.45
	3	1.20	1.44	1.68	1.61	1.61
	4	0.64	0.72	1.13	1.29	1.95
	5	1.12	1.68	2.17	2.41	2.56
	6	0.82	1.60	2.57	2.33	2.25
	7	1.29	1.37	1.45	1.37	1.61
	8	1.44	1.60	1.93	2.25	2.26
	9	0.80	1.44	1.61	1.93	2.26
	10	1.12	1.28	1.77	1.69	2.26
	11	1.12	1.84	2.00	2.08	2.25
	12	0.51	1.28	1.60	2.00	1.92
	13	1.12	1.93	1.85	2.09	2.42
	14	0.56	0.64	0.64	0.80	1.21
	15	0.80	1.12	1.12	1.53	1.45
	16	0.80	1.29	1.45	1.69	2.34
	17	1.28	2.25	2.41	2.25	2.41
	18	0.88	1.60	2.25	1.77	1.87
	19	1.12	1.12	1.28	1.44	1.44
	20	0.96	1.76	1.76	1.60	2.09
	21	1.12	1.28	1.28	1.77	2.02
	22	0.64	0.90	1.28	1.77	1.93
	23	1.68	2.88	2.56	2.08	2.08
	24	0.72	1.60	1.52	2.00	2.00
II	1	1.01	0.91	1.77	1.77	1.48
	2	0.72	1.12	1.61	1.87	2.02
	3	0.96	1.95	1.79	1.79	1.87
	4	0.45	0.96	1.04	1.29	1.37
	5	0.64	1.77	2.26	2.13	2.06
	6	1.20	1.45	1.93	2.02	2.42
	7	0.50	0.80	1.37	1.61	1.79
	8	0.72	1.44	1.52	1.45	2.10

Table A.16 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	0.91	1.53	1.76	1.93	2.09
	10	1.52	1.52	1.69	2.01	2.76
	11	0.96	1.28	1.61	1.77	1.93
	12	0.64	1.45	1.45	1.61	1.61
	13	1.01	1.28	2.00	2.25	1.87
	14	1.02	1.12	1.93	2.18	2.26
	15	1.02	1.92	2.25	2.40	2.25
	16	1.28	1.36	1.44	1.44	1.77
	17	0.80	1.29	1.37	1.79	1.82
	18	0.80	0.96	1.68	1.69	1.53
	19	0.36	0.80	0.64	1.20	1.45
	20	0.68	1.44	1.52	1.61	2.09
	21	1.07	1.60	1.84	1.61	1.85
	22	0.72	1.20	1.68	2.41	2.34
	23	1.68	1.77	1.95	1.82	1.82
	24	1.12	1.36	1.28	1.45	1.45

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Table A.17 Buccal cortical bone thickness (BC) between the second premolar and the first molar at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	0.80	1.04	1.61	2.58	2.58
	2	0.48	0.80	0.97	1.37	2.26
	3	1.20	0.96	1.45	1.77	1.69
	4	0.88	0.97	1.29	1.61	2.26
	5	1.12	2.24	2.80	2.88	3.53
	6	1.60	2.25	2.41	2.25	2.26
	7	1.29	1.29	1.45	1.53	1.77
	8	1.61	2.09	2.25	2.26	2.72
	9	1.04	1.60	2.01	3.53	3.53
	10	1.12	1.28	1.60	1.93	2.74
	11	1.12	1.76	1.85	2.24	2.17
	12	1.15	1.04	1.28	1.44	1.60
	13	0.72	1.76	2.09	2.72	3.08
	14	0.45	0.48	0.56	0.74	1.77
	15	1.28	1.36	1.29	1.93	1.77
	16	0.80	1.12	1.77	2.10	2.51
	17	1.05	1.12	2.16	2.25	2.88
	18	2.24	1.61	2.25	2.42	2.18
	19	1.12	1.29	1.29	1.29	1.45
	20	2.16	2.16	2.24	2.88	2.96
	21	0.56	0.72	1.13	2.88	3.87
	22	1.60	1.68	1.61	2.41	2.26
	23	0.80	1.84	1.53	1.76	2.25
	24	0.80	1.52	1.76	1.37	1.28
II	1	1.22	1.60	1.76	2.25	2.76
	2	0.80	1.29	1.53	1.87	1.63
	3	2.08	2.25	2.41	2.25	3.06
	4	1.01	1.04	1.45	1.53	1.48
	5	1.37	1.45	1.53	1.63	2.29
	6	1.13	1.21	2.01	2.90	2.58
	7	0.40	1.12	1.60	1.77	1.77
	8	0.88	1.92	2.09	2.57	2.42

Table A.17 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	1.29	1.60	1.61	2.10	2.10
	10	1.60	1.92	2.64	2.64	3.04
	11	0.72	1.29	1.85	2.26	2.42
	12	0.96	1.60	1.29	1.29	1.48
	13	1.07	1.28	1.76	2.24	3.04
	14	0.80	1.61	1.45	1.61	1.93
	15	1.52	1.92	2.24	2.40	3.04
	16	1.28	1.36	1.52	2.09	2.42
	17	0.64	1.12	1.45	1.61	2.26
	18	0.72	1.60	1.77	2.25	2.49
	19	0.48	0.72	0.64	1.52	1.77
	20	1.02	1.44	1.44	1.93	2.66
	21	0.72	1.84	1.84	1.93	1.93
	22	2.41	3.04	2.72	2.42	2.90
	23	0.72	1.13	1.53	1.77	2.41
	24	1.20	1.36	1.28	1.61	2.42

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Table A.18 Buccal cortical bone thickness (BC) between the first and second molars at different vertical heights from the CEJ of the mandible in the patients with Class I and Class II skeletal patterns (left and right sides combined)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
I	1	1.12	1.76	2.56	3.36	4.32
	2	1.76	2.33	2.10	3.44	2.74
	3	0.80	1.92	2.24	2.09	2.26
	4	0.80	1.45	2.64	3.06	3.34
	5	1.61	3.85	4.51	3.89	3.26
	6	3.04	3.04	3.84	3.12	3.14
	7	1.28	1.60	2.13	2.29	2.76
	8	2.00	2.25	2.95	3.55	3.77
	9	3.52	4.49	4.49	4.09	3.69
	10	2.41	2.88	3.38	3.52	3.52
	11	2.40	3.04	3.68	4.16	4.16
	12	0.80	1.20	1.84	2.09	2.33
	13	1.28	2.72	3.06	4.35	2.92
	14	0.48	1.20	1.45	2.10	2.42
	15	0.40	1.28	1.52	1.93	2.58
	16	1.76	2.56	3.26	3.65	3.57
	17	1.12	1.60	3.20	4.25	4.51
	18	2.00	3.04	3.52	3.20	2.88
	19	1.29	2.10	2.33	2.48	2.48
	20	1.52	1.92	2.72	3.55	3.55
	21	4.17	5.13	4.17	3.71	3.16
	22	3.36	3.52	3.36	3.52	3.53
	23	2.56	2.25	3.22	3.39	3.42
	24	0.97	1.60	2.24	2.32	2.33
II	1	1.38	1.61	2.48	3.49	2.87
	2	1.13	1.28	2.08	1.95	3.53
	3	2.05	2.74	3.71	3.87	4.05
	4	0.80	1.37	2.18	2.88	3.39
	5	1.37	1.45	2.53	3.14	3.34
	6	2.24	2.88	2.25	2.90	2.58
	7	0.64	1.45	2.74	1.93	2.08
	8	1.68	2.01	2.56	2.72	3.06

Table A.18 (continued)

Skeletal pattern	Subject	Buccal cortical bone thickness (mm)				
		2 mm	4 mm	6 mm	8 mm	10 mm
II	9	1.92	2.09	2.95	3.04	2.84
	10	2.24	3.04	3.68	3.52	3.52
	11	2.26	2.76	3.08	2.95	2.79
	12	1.28	1.77	2.42	3.11	3.11
	13	1.25	2.09	2.88	3.69	3.24
	14	0.97	1.04	2.01	2.17	3.11
	15	1.93	2.88	3.68	4.32	3.84
	16	1.12	1.77	2.72	3.39	3.24
	17	1.44	2.41	3.80	3.41	3.04
	18	0.48	1.68	2.16	3.04	3.04
	19	0.56	0.32	0.88	2.40	3.20
	20	1.44	2.09	2.74	2.92	2.74
	21	1.61	1.84	1.79	2.18	2.84
	22	1.76	2.72	4.03	3.92	3.58
	23	1.20	2.72	2.88	2.57	2.50
	24	1.36	2.26	3.71	3.26	3.26

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Table A.19 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
2 mm	Equal variances assumed	.081	.777	-5.375	46	.000	-.96875	.18024	-1.33155	-.60595
	Equal variances not assumed			-5.375	45.951	.000	-.96875	.18024	-1.33156	-.60594
4 mm	Equal variances assumed	.034	.855	-5.710	46	.000	-1.27542	.22338	-1.72506	-.82578
	Equal variances not assumed			-5.710	45.774	.000	-1.27542	.22338	-1.72512	-.82572
6 mm	Equal variances assumed	.878	.354	-6.308	46	.000	-1.66542	.26402	-2.19686	-1.13397
	Equal variances not assumed			-6.308	44.397	.000	-1.66542	.26402	-2.19738	-1.13346
8 mm	Equal variances assumed	1.614	.210	-7.685	46	.000	-2.27917	.29658	-2.87616	-1.68217
	Equal variances not assumed			-7.685	43.148	.000	-2.27917	.29658	-2.87723	-1.68111
10 mm	Equal variances assumed	.852	.361	-8.548	46	.000	-2.68708	.31436	-3.31985	-2.05432
	Equal variances not assumed			-8.548	44.150	.000	-2.68708	.31436	-3.32056	-2.05360

Table A.20 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	3.434	.070	-.077	46	.939	-.01083	.14088	-.29442	.27275
	Equal variances not assumed			-.077	42.876	.939	-.01083	.14088	-.29497	.27331
4 mm	Equal variances assumed	3.393	.072	-.457	46	.650	-.08458	.18513	-.45724	.28807
	Equal variances not assumed			-.457	42.428	.650	-.08458	.18513	-.45809	.28892
6 mm	Equal variances assumed	1.051	.311	-.563	46	.576	-.11708	.20803	-.53583	.30166
	Equal variances not assumed			-.563	43.580	.576	-.11708	.20803	-.53646	.30229
8 mm	Equal variances assumed	.175	.678	-.433	46	.667	-.10625	.24556	-.60054	.38804
	Equal variances not assumed			-.433	45.430	.667	-.10625	.24556	-.60071	.38821
10 mm	Equal variances assumed	.135	.715	-.385	46	.702	-.13333	.34656	-.83092	.56425
	Equal variances not assumed			-.385	45.364	.702	-.13333	.34656	-.83118	.56452

Table A.21 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.158	.693	-6.549	46	.000	-1.16708	.17821	-1.52580	-.80837
	Equal variances not assumed			-6.549	45.952	.000	-1.16708	.17821	-1.52581	-.80836
4 mm	Equal variances assumed	.608	.440	-6.724	46	.000	-1.37250	.20411	-1.78335	-.96165
	Equal variances not assumed			-6.724	45.618	.000	-1.37250	.20411	-1.78345	-.96155
6 mm	Equal variances assumed	2.742	.105	-8.442	46	.000	-1.97708	.23419	-2.44849	-1.50567
	Equal variances not assumed			-8.442	40.869	.000	-1.97708	.23419	-2.45010	-1.50407
8 mm	Equal variances assumed	6.288	.016	-8.860	46	.000	-2.42750	.27398	-2.97900	-1.87600
	Equal variances not assumed			-8.860	37.239	.000	-2.42750	.27398	-2.98252	-1.87248
10 mm	Equal variances assumed	7.112	.011	-8.229	46	.000	-2.97292	.36128	-3.70015	-2.24569
	Equal variances not assumed			-8.229	38.221	.000	-2.97292	.36128	-3.70416	-2.24167

Table A.22 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.740	.394	-4.917	46	.000	-.76083	.15474	-1.07231	-.44936
	Equal variances not assumed			-4.917	44.975	.000	-.76083	.15474	-1.07250	-.44916
4 mm	Equal variances assumed	.014	.906	-6.358	46	.000	-1.16542	.18331	-1.53440	-.79643
	Equal variances not assumed			-6.358	45.961	.000	-1.16542	.18331	-1.53441	-.79642
6 mm	Equal variances assumed	.073	.788	-7.988	46	.000	-1.55500	.19467	-1.94684	-1.16316
	Equal variances not assumed			-7.988	45.246	.000	-1.55500	.19467	-1.94702	-1.16298
8 mm	Equal variances assumed	.589	.447	-7.658	46	.000	-1.95250	.25497	-2.46573	-1.43927
	Equal variances not assumed			-7.658	44.379	.000	-1.95250	.25497	-2.46624	-1.43876
10 mm	Equal variances assumed	2.876	.097	-7.723	46	.000	-2.22417	.28799	-2.80386	-1.64447
	Equal variances not assumed			-7.723	41.148	.000	-2.22417	.28799	-2.80571	-1.64262

Table A.23 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	1.048	.311	-.344	46	.732	-.05292	.15385	-.36261	.25678
	Equal variances not assumed			-.344	44.223	.733	-.05292	.15385	-.36294	.25711
4 mm	Equal variances assumed	5.518	.023	-.295	46	.769	-.06208	.21016	-.48512	.36095
	Equal variances not assumed			-.295	40.751	.769	-.06208	.21016	-.48659	.36243
6 mm	Equal variances assumed	3.129	.084	-.615	46	.542	-.15417	.25074	-.65888	.35055
	Equal variances not assumed			-.615	43.528	.542	-.15417	.25074	-.65965	.35132
8 mm	Equal variances assumed	3.048	.087	-.639	46	.526	-.18875	.29538	-.78332	.40582
	Equal variances not assumed			-.639	41.860	.526	-.18875	.29538	-.78491	.40741
10 mm	Equal variances assumed	5.003	.030	-.662	46	.511	-.24875	.37559	-1.00478	.50728
	Equal variances not assumed			-.662	38.954	.512	-.24875	.37559	-1.00848	.51098

Table A.24 Comparison of mesiodistal distances (MD) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.849	.362	-7.553	46	.000	-1.06917	.14155	-1.35408	-.78425
	Equal variances not assumed			-7.553	42.924	.000	-1.06917	.14155	-1.35464	-.78370
4 mm	Equal variances assumed	1.195	.280	-5.844	46	.000	-1.30250	.22288	-1.75114	-.85386
	Equal variances not assumed			-5.844	41.548	.000	-1.30250	.22288	-1.75244	-.85256
6 mm	Equal variances assumed	.578	.451	-5.419	46	.000	-1.53292	.28289	-2.10234	-.96349
	Equal variances not assumed			-5.419	42.429	.000	-1.53292	.28289	-2.10364	-.96219
8 mm	Equal variances assumed	1.334	.254	-4.266	46	.000	-1.69500	.39730	-2.49472	-.89528
	Equal variances not assumed			-4.266	39.168	.000	-1.69500	.39730	-2.49850	-.89150
10 mm	Equal variances assumed	.695	.409	-3.777	46	.000	-1.75667	.46510	-2.69286	-.82048
	Equal variances not assumed			-3.777	43.412	.000	-1.75667	.46510	-2.69436	-.81897

Table A.25 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
2 mm	Equal variances assumed	.127	.723	2.060	46	.045	1.08042	.52457	.02452	2.13631
	Equal variances not assumed			2.060	45.785	.045	1.08042	.52457	.02439	2.13645
4 mm	Equal variances assumed	2.534	.118	2.618	46	.012	1.13583	.43389	.26245	2.00921
	Equal variances not assumed			2.618	33.853	.013	1.13583	.43389	.25392	2.01775
6 mm	Equal variances assumed	3.112	.084	1.349	46	.184	.50417	.37374	-.24813	1.25646
	Equal variances not assumed			1.349	34.343	.186	.50417	.37374	-.25508	1.26342
8 mm	Equal variances assumed	2.512	.120	-.566	46	.574	-.19083	.33711	-.86940	.48774
	Equal variances not assumed			-.566	43.107	.574	-.19083	.33711	-.87063	.48897
10 mm	Equal variances assumed	.067	.798	-.226	46	.822	-.09042	.39961	-.89480	.71396
	Equal variances not assumed			-.226	45.262	.822	-.09042	.39961	-.89515	.71432

Table A.26 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.223	.639	2.711	46	.009	1.18375	.43663	.30487	2.06263
	Equal variances not assumed			2.711	45.786	.009	1.18375	.43663	.30476	2.06274
4 mm	Equal variances assumed	.951	.335	4.742	46	.000	1.56125	.32926	.89848	2.22402
	Equal variances not assumed			4.742	42.904	.000	1.56125	.32926	.89719	2.22531
6 mm	Equal variances assumed	.279	.600	1.891	46	.065	.73833	.39036	-.04742	1.52409
	Equal variances not assumed			1.891	43.974	.065	.73833	.39036	-.04840	1.52506
8 mm	Equal variances assumed	.006	.939	.679	46	.500	.29875	.43971	-.58633	1.18383
	Equal variances not assumed			.679	46.000	.500	.29875	.43971	-.58633	1.18383
10 mm	Equal variances assumed	.000	.987	1.581	46	.121	.74125	.46889	-.20257	1.68507
	Equal variances not assumed			1.581	45.628	.121	.74125	.46889	-.20277	1.68527

Table A.27 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.052	.821	3.198	46	.003	2.23958	.70032	.82991	3.64926
	Equal variances not assumed			3.198	45.514	.003	2.23958	.70032	.82950	3.64966
4 mm	Equal variances assumed	3.539	.066	2.453	46	.018	1.39583	.56914	.25022	2.54145
	Equal variances not assumed			2.453	40.084	.019	1.39583	.56914	.24563	2.54603
6 mm	Equal variances assumed	13.694	.001	.287	46	.775	.15250	.53099	-.91632	1.22132
	Equal variances not assumed			.287	32.103	.776	.15250	.53099	-.92895	1.23395
8 mm	Equal variances assumed	16.293	.000	-.443	46	.660	-.22375	.50499	-1.24024	.79274
	Equal variances not assumed			-.443	30.679	.661	-.22375	.50499	-1.25412	.80662
10 mm	Equal variances assumed	17.981	.000	.041	46	.968	.02167	.53096	-1.04709	1.09042
	Equal variances not assumed			.041	32.073	.968	.02167	.53096	-1.05976	1.10309

Table A.28 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.927	.341	2.424	46	.019	.92333	.38099	.15644	1.69022
	Equal variances not assumed			2.424	44.568	.019	.92333	.38099	.15578	1.69089
4 mm	Equal variances assumed	15.725	.000	2.743	46	.009	.99958	.36435	.26617	1.73299
	Equal variances not assumed			2.743	33.063	.010	.99958	.36435	.25835	1.74082
6 mm	Equal variances assumed	12.491	.001	.449	46	.655	.21583	.48052	-.75141	1.18307
	Equal variances not assumed			.449	32.780	.656	.21583	.48052	-.76204	1.19371
8 mm	Equal variances assumed	6.739	.013	.464	46	.645	.24083	.51900	-.80386	1.28553
	Equal variances not assumed			.464	36.809	.645	.24083	.51900	-.81095	1.29261
10 mm	Equal variances assumed	.589	.447	1.450	46	.154	.80625	.55614	-.31320	1.92570
	Equal variances not assumed			1.450	44.860	.154	.80625	.55614	-.31396	1.92646

Table A.29 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.611	.438	1.648	46	.106	.84792	.51445	-.18761	1.88344
	Equal variances not assumed			1.648	44.678	.106	.84792	.51445	-.18844	1.88427
4 mm	Equal variances assumed	.493	.486	4.993	46	.000	1.65917	.33233	.99023	2.32811
	Equal variances not assumed			4.993	43.829	.000	1.65917	.33233	.98933	2.32900
6 mm	Equal variances assumed	1.758	.191	3.410	46	.001	1.46208	.42873	.59909	2.32508
	Equal variances not assumed			3.410	41.022	.001	1.46208	.42873	.59625	2.32791
8 mm	Equal variances assumed	.343	.561	2.879	46	.006	1.53458	.53310	.46152	2.60765
	Equal variances not assumed			2.879	44.534	.006	1.53458	.53310	.46056	2.60861
10 mm	Equal variances assumed	.025	.875	3.947	46	.000	2.41000	.61055	1.18102	3.63898
	Equal variances not assumed			3.947	45.957	.000	2.41000	.61055	1.18099	3.63901

Table A.30 Comparison of buccolingual alveolar process width (BL) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.329	.569	3.307	46	.002	1.61708	.48900	.63278	2.60139
	Equal variances not assumed			3.307	44.960	.002	1.61708	.48900	.63216	2.60200
4 mm	Equal variances assumed	.443	.509	7.368	46	.000	2.84333	.38592	2.06651	3.62016
	Equal variances not assumed			7.368	44.629	.000	2.84333	.38592	2.06586	3.62080
6 mm	Equal variances assumed	1.489	.229	4.945	46	.000	1.93958	.39223	1.15006	2.72911
	Equal variances not assumed			4.945	45.273	.000	1.93958	.39223	1.14971	2.72945
8 mm	Equal variances assumed	.475	.494	2.967	46	.005	1.21667	.41007	.39123	2.04210
	Equal variances not assumed			2.967	45.969	.005	1.21667	.41007	.39122	2.04211
10 mm	Equal variances assumed	.114	.737	3.554	46	.001	1.83542	.51647	.79581	2.87502
	Equal variances not assumed			3.554	45.340	.001	1.83542	.51647	.79541	2.87543

Table A.31 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	3.670	.062	-2.445	46	.018	-.19333	.07906	-.35247	-.03420
	Equal variances not assumed			-2.445	43.238	.019	-.19333	.07906	-.35274	-.03392
4 mm	Equal variances assumed	.984	.326	-3.964	46	.000	-.48250	.12171	-.72749	-.23751
	Equal variances not assumed			-3.964	41.843	.000	-.48250	.12171	-.72815	-.23685
6 mm	Equal variances assumed	2.724	.106	-4.278	46	.000	-.54750	.12799	-.80513	-.28987
	Equal variances not assumed			-4.278	40.754	.000	-.54750	.12799	-.80603	-.28897
8 mm	Equal variances assumed	.147	.703	-6.552	46	.000	-.72458	.11059	-.94719	-.50198
	Equal variances not assumed			-6.552	45.826	.000	-.72458	.11059	-.94721	-.50196
10 mm	Equal variances assumed	.183	.671	-7.421	46	.000	-.77292	.10415	-.98255	-.56328
	Equal variances not assumed			-7.421	45.791	.000	-.77292	.10415	-.98258	-.56325

Table A.32 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	1.647	.206	-2.537	46	.015	-.28708	.11317	-.51489	-.05928
	Equal variances not assumed			-2.537	39.964	.015	-.28708	.11317	-.51582	-.05835
4 mm	Equal variances assumed	8.378	.006	-3.975	46	.000	-.46375	.11666	-.69857	-.22893
	Equal variances not assumed			-3.975	36.998	.000	-.46375	.11666	-.70012	-.22738
6 mm	Equal variances assumed	3.294	.076	-4.942	46	.000	-.63208	.12790	-.88952	-.37464
	Equal variances not assumed			-4.942	40.844	.000	-.63208	.12790	-.89040	-.37376
8 mm	Equal variances assumed	14.559	.000	-7.556	46	.000	-1.07792	.14265	-1.36506	-.79077
	Equal variances not assumed			-7.556	30.476	.000	-1.07792	.14265	-1.36906	-.78677
10 mm	Equal variances assumed	5.036	.030	-7.306	46	.000	-1.20875	.16545	-1.54178	-.87572
	Equal variances not assumed			-7.306	39.297	.000	-1.20875	.16545	-1.54332	-.87418

Table A.33 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class I skeletal pattern (left and right sides combined)

Independent Samples Test

Class I		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	13.625	.001	-4.321	46	.000	-.95708	.22150	-1.40293	-.51123
	Equal variances not assumed			-4.321	30.598	.000	-.95708	.22150	-1.40907	-.50510
4 mm	Equal variances assumed	16.055	.000	-6.115	46	.000	-1.36958	.22397	-1.82040	-.91876
	Equal variances not assumed			-6.115	28.528	.000	-1.36958	.22397	-1.82797	-.91119
6 mm	Equal variances assumed	15.704	.000	-9.717	46	.000	-1.85875	.19129	-2.24380	-1.47370
	Equal variances not assumed			-9.717	30.929	.000	-1.85875	.19129	-2.24893	-1.46857
8 mm	Equal variances assumed	7.812	.008	-10.968	46	.000	-1.97125	.17973	-2.33304	-1.60946
	Equal variances not assumed			-10.968	37.775	.000	-1.97125	.17973	-2.33517	-1.60733
10 mm	Equal variances assumed	3.037	.088	-11.042	46	.000	-1.81458	.16434	-2.14538	-1.48379
	Equal variances not assumed			-11.042	42.782	.000	-1.81458	.16434	-2.14605	-1.48312

Table A.34 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the first and second premolars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	9.639	.003	-3.790	46	.000	-.26833	.07080	-.41085	-.12581
	Equal variances not assumed			-3.790	31.589	.001	-.26833	.07080	-.41263	-.12404
4 mm	Equal variances assumed	.645	.426	-3.237	46	.002	-.32958	.10180	-.53450	-.12466
	Equal variances not assumed			-3.237	45.035	.002	-.32958	.10180	-.53462	-.12454
6 mm	Equal variances assumed	.061	.805	-4.640	46	.000	-.49667	.10705	-.71215	-.28119
	Equal variances not assumed			-4.640	45.866	.000	-.49667	.10705	-.71216	-.28117
8 mm	Equal variances assumed	1.855	.180	-4.981	46	.000	-.54750	.10991	-.76873	-.32627
	Equal variances not assumed			-4.981	43.013	.000	-.54750	.10991	-.76915	-.32585
10 mm	Equal variances assumed	.389	.536	-5.874	46	.000	-.54458	.09271	-.73120	-.35797
	Equal variances not assumed			-5.874	44.968	.000	-.54458	.09271	-.73131	-.35786

Table A.35 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the second premolar and the first molar at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	10.314	.002	-3.957	46	.000	-.40750	.10297	-.61478	-.20022
	Equal variances not assumed			-3.957	28.773	.000	-.40750	.10297	-.61818	-.19682
4 mm	Equal variances assumed	1.701	.199	-4.754	46	.000	-.55000	.11570	-.78288	-.31712
	Equal variances not assumed			-4.754	40.026	.000	-.55000	.11570	-.78383	-.31617
6 mm	Equal variances assumed	.036	.851	-4.758	46	.000	-.58583	.12313	-.83368	-.33799
	Equal variances not assumed			-4.758	44.807	.000	-.58583	.12313	-.83385	-.33781
8 mm	Equal variances assumed	4.184	.047	-7.875	46	.000	-.81375	.10334	-1.02176	-.60574
	Equal variances not assumed			-7.875	41.774	.000	-.81375	.10334	-1.02233	-.60517
10 mm	Equal variances assumed	4.951	.031	-9.849	46	.000	-1.19292	.12113	-1.43673	-.94910
	Equal variances not assumed			-9.849	39.265	.000	-1.19292	.12113	-1.43786	-.94797

Table A.36 Comparison of buccal cortical bone thickness (BC) between maxilla and mandible at between the first and second molars at different vertical heights from the CEJ in the patients with Class II skeletal pattern (left and right sides combined)

Independent Samples Test

Class II		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	11.131	.002	-5.893	46	.000	-.68458	.11617	-.91843	-.45074
	Equal variances not assumed			-5.893	31.324	.000	-.68458	.11617	-.92142	-.44774
4 mm	Equal variances assumed	3.039	.088	-5.274	46	.000	-.88208	.16727	-1.21877	-.54539
	Equal variances not assumed			-5.274	40.045	.000	-.88208	.16727	-1.22013	-.54404
6 mm	Equal variances assumed	7.846	.007	-9.510	46	.000	-1.61958	.17031	-1.96240	-1.27677
	Equal variances not assumed			-9.510	32.734	.000	-1.61958	.17031	-1.96619	-1.27298
8 mm	Equal variances assumed	5.045	.030	-12.483	46	.000	-1.85167	.14833	-2.15024	-1.55309
	Equal variances not assumed			-12.483	37.347	.000	-1.85167	.14833	-2.15212	-1.55121
10 mm	Equal variances assumed	.020	.887	-13.743	46	.000	-1.77083	.12885	-2.03020	-1.51146
	Equal variances not assumed			-13.743	45.877	.000	-1.77083	.12885	-2.03022	-1.51145

Table A.37 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	1.515	.225	-.497	46	.621	-.08000	.16086	-.40380	.24380
	Equal variances not assumed			-.497	43.979	.621	-.08000	.16086	-.40420	.24420
4 mm	Equal variances assumed	.595	.444	-.086	46	.932	-.01708	.19876	-.41717	.38301
	Equal variances not assumed			-.086	44.643	.932	-.01708	.19876	-.41750	.38334
6 mm	Equal variances assumed	1.609	.211	-.762	46	.450	-.16125	.21150	-.58697	.26447
	Equal variances not assumed			-.762	43.042	.450	-.16125	.21150	-.58777	.26527
8 mm	Equal variances assumed	.461	.501	-1.546	46	.129	-.37542	.24283	-.86421	.11337
	Equal variances not assumed			-1.546	45.468	.129	-.37542	.24283	-.86436	.11353
10 mm	Equal variances assumed	1.025	.317	-2.040	46	.047	-.52625	.25792	-1.21929	.16679
	Equal variances not assumed			-2.040	44.535	.047	-.52625	.25792	-1.22027	.16777

Table A.38 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.000	.995	.893	46	.376	.14625	.16374	-.18334	.47584
	Equal variances not assumed			.893	45.836	.376	.14625	.16374	-.18337	.47587
4 mm	Equal variances assumed	.628	.432	.318	46	.752	.07250	.22830	-.38704	.53204
	Equal variances not assumed			.318	44.967	.752	.07250	.22830	-.38733	.53233
6 mm	Equal variances assumed	1.605	.212	.359	46	.721	.09208	.25625	-.42372	.60789
	Equal variances not assumed			.359	44.468	.721	.09208	.25625	-.42420	.60837
8 mm	Equal variances assumed	1.897	.175	.792	46	.432	.23875	.30145	-.36803	.84553
	Equal variances not assumed			.792	43.043	.433	.23875	.30145	-.36916	.84666
10 mm	Equal variances assumed	1.377	.247	.575	46	.568	.23542	.40950	-.58887	1.05970
	Equal variances not assumed			.575	44.248	.568	.23542	.40950	-.58975	1.06059

Table A.39 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	2.983	.091	-.185	46	.854	-.02792	.15068	-.33121	.27538
	Equal variances not assumed			-.185	40.883	.854	-.02792	.15068	-.33224	.27641
4 mm	Equal variances assumed	.118	.733	-.757	46	.453	-.14292	.18876	-.52287	.23704
	Equal variances not assumed			-.757	45.823	.453	-.14292	.18876	-.52291	.23708
6 mm	Equal variances assumed	.496	.485	-2.305	46	.026	-.49500	.21474	-1.07200	.08200
	Equal variances not assumed			-2.305	43.650	.026	-.49500	.21474	-1.07334	.08334
8 mm	Equal variances assumed	4.020	.051	-2.477	46	.017	-.63292	.25552	-1.14724	-.11859
	Equal variances not assumed			-2.477	39.438	.018	-.63292	.25552	-1.14956	-.11627
10 mm	Equal variances assumed	3.599	.064	-1.611	46	.114	-.55250	.34289	-1.24269	.13769
	Equal variances not assumed			-1.611	39.909	.115	-.55250	.34289	-1.24555	.14055

Table A.40 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
2 mm	Equal variances assumed	.002	.966	.732	46	.468	.12792	.17480	-.22393	.47977
	Equal variances not assumed			.732	45.563	.468	.12792	.17480	-.22402	.47986
4 mm	Equal variances assumed	.947	.336	.443	46	.660	.09292	.20975	-.32928	.51512
	Equal variances not assumed			.443	43.989	.660	.09292	.20975	-.32980	.51564
6 mm	Equal variances assumed	3.124	.084	-.203	46	.840	-.05083	.25074	-.55554	.45387
	Equal variances not assumed			-.203	41.740	.840	-.05083	.25074	-.55693	.45527
8 mm	Equal variances assumed	1.117	.296	-.159	46	.874	-.04875	.30661	-.66592	.56842
	Equal variances not assumed			-.159	44.614	.874	-.04875	.30661	-.66643	.56893
10 mm	Equal variances assumed	.026	.873	-.187	46	.853	-.06333	.33946	-.74663	.61997
	Equal variances not assumed			-.187	45.950	.853	-.06333	.33946	-.74665	.61999

Table A.41 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.338	.564	.806	46	.424	.10417	.12926	-.15602	.36435
	Equal variances not assumed			.806	45.204	.425	.10417	.12926	-.15614	.36448
4 mm	Equal variances assumed	.009	.926	.586	46	.561	.09500	.16224	-.23158	.42158
	Equal variances not assumed			.586	45.738	.561	.09500	.16224	-.23163	.42163
6 mm	Equal variances assumed	.136	.714	.273	46	.786	.05500	.20120	-.35000	.46000
	Equal variances not assumed			.273	44.511	.786	.05500	.20120	-.35037	.46037
8 mm	Equal variances assumed	.002	.967	.656	46	.515	.15625	.23807	-.32297	.63547
	Equal variances not assumed			.656	45.860	.515	.15625	.23807	-.32301	.63551
10 mm	Equal variances assumed	.464	.499	.392	46	.697	.12000	.30574	-.49543	.73543
	Equal variances not assumed			.392	45.204	.697	.12000	.30574	-.49572	.73572

Table A.42 Comparison of mesiodistal distance (MD) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
MD 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	1.225	.274	.410	46	.683	.07000	.17056	-.27332	.41332
	Equal variances not assumed			.410	45.271	.683	.07000	.17056	-.27347	.41347
4 mm	Equal variances assumed	.045	.834	-.309	46	.759	-.07292	.23602	-.54800	.40217
	Equal variances not assumed			-.309	44.499	.759	-.07292	.23602	-.54843	.40260
6 mm	Equal variances assumed	.009	.927	-.171	46	.865	-.05083	.29793	-.65054	.54887
	Equal variances not assumed			-.171	44.807	.865	-.05083	.29793	-.65097	.54930
8 mm	Equal variances assumed	.619	.436	.243	46	.809	.09958	.40942	-.72453	.92370
	Equal variances not assumed			.243	41.360	.809	.09958	.40942	-.72704	.92620
10 mm	Equal variances assumed	.134	.716	1.386	46	.172	.66375	.47882	-.30007	1.62757
	Equal variances not assumed			1.386	44.651	.173	.66375	.47882	-.30086	1.62836

Table A.43 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	2.576	.115	2.402	46	.020	1.04083	.43328	.16869	1.91298
	Equal variances not assumed			2.402	40.582	.021	1.04083	.43328	.16553	1.91613
4 mm	Equal variances assumed	1.167	.286	2.245	46	.030	.56167	.25020	.05803	1.06530
	Equal variances not assumed			2.245	44.129	.030	.56167	.25020	.05746	1.06588
6 mm	Equal variances assumed	.691	.410	.532	46	.597	.14208	.26699	-.39534	.67951
	Equal variances not assumed			.532	44.523	.597	.14208	.26699	-.39582	.67999
8 mm	Equal variances assumed	2.217	.143	-.977	46	.334	-.32333	.33089	-.98937	.34271
	Equal variances not assumed			-.977	43.672	.334	-.32333	.33089	-.99033	.34367
10 mm	Equal variances assumed	.867	.357	-1.104	46	.275	-.51792	.46907	-1.46211	.42627
	Equal variances not assumed			-1.104	44.532	.275	-.51792	.46907	-1.46295	.42712

Table A.44 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	2.049	.159	2.115	46	.040	1.04458	.49385	.05051	2.03866
	Equal variances not assumed			2.115	42.836	.040	1.04458	.49385	.04852	2.04064
4 mm	Equal variances assumed	.098	.755	1.749	46	.087	.50250	.28736	-.07592	1.08092
	Equal variances not assumed			1.749	45.927	.087	.50250	.28736	-.07594	1.08094
6 mm	Equal variances assumed	.180	.673	-.130	46	.897	-.04500	.34601	-.74149	.65149
	Equal variances not assumed			-.130	46.000	.897	-.04500	.34601	-.74149	.65149
8 mm	Equal variances assumed	.009	.926	-1.084	46	.284	-.50042	.46182	-1.43000	.42917
	Equal variances not assumed			-1.084	45.625	.284	-.50042	.46182	-1.43021	.42938
10 mm	Equal variances assumed	.996	.324	-1.456	46	.152	-.81333	.55852	-1.93757	.31090
	Equal variances not assumed			-1.456	43.659	.152	-.81333	.55852	-1.93920	.31253

Table A.45 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	1.339	.253	1.905	46	.063	1.21750	.63900	-.06873	2.50373
	Equal variances not assumed			1.905	41.597	.064	1.21750	.63900	-.07242	2.50742
4 mm	Equal variances assumed	.045	.833	.221	46	.826	.09583	.43273	-.77521	.96688
	Equal variances not assumed			.221	45.805	.826	.09583	.43273	-.77531	.96698
6 mm	Equal variances assumed	.421	.520	-1.252	46	.217	-.42542	.33970	-1.10920	.25837
	Equal variances not assumed			-1.252	44.792	.217	-.42542	.33970	-1.10970	.25887
8 mm	Equal variances assumed	1.149	.289	-.907	46	.369	-.31333	.34538	-1.00854	.38187
	Equal variances not assumed			-.907	40.383	.370	-.31333	.34538	-1.01116	.38449
10 mm	Equal variances assumed	3.083	.086	-2.500	46	.016	-1.11125	.44444	-2.00587	-.21663
	Equal variances not assumed			-2.500	36.408	.017	-1.11125	.44444	-2.01227	-.21023

Table A.46 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.059	.809	1.832	46	.073	.88375	.48228	-.08702	
	Equal variances not assumed			1.832	43.001	.074	.88375	.48228	-.08885	
4 mm	Equal variances assumed	.099	.754	.837	46	.407	.42542	.50834	-.59783	1.44866
	Equal variances not assumed			.837	44.782	.407	.42542	.50834	-.59858	1.44941
6 mm	Equal variances assumed	3.401	.072	-.267	46	.790	-.14625	.54708	-1.24747	.95497
	Equal variances not assumed			-.267	43.058	.790	-.14625	.54708	-1.24950	.95700
8 mm	Equal variances assumed	6.149	.017	.207	46	.837	.10833	.52299	-.94439	1.16106
	Equal variances not assumed			.207	37.477	.837	.10833	.52299	-.95089	1.16756
10 mm	Equal variances assumed	3.016	.089	.759	46	.452	.37875	.49895	-.62559	1.38309
	Equal variances not assumed			.759	38.526	.452	.37875	.49895	-.63087	1.38837

Table A.47 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.060	.808	1.541	46	.130	.70875	.45979	-.21676	1.63426
	Equal variances not assumed			1.541	45.939	.130	.70875	.45979	-.21679	1.63429
4 mm	Equal variances assumed	.001	.979	1.626	46	.111	.60042	.36916	-.14266	1.34350
	Equal variances not assumed			1.626	45.996	.111	.60042	.36916	-.14267	1.34350
6 mm	Equal variances assumed	.278	.601	1.459	46	.151	.67875	.46526	-.25777	1.61527
	Equal variances not assumed			1.459	45.053	.152	.67875	.46526	-.25830	1.61580
8 mm	Equal variances assumed	.435	.513	1.431	46	.159	.73542	.51406	-.29934	1.77017
	Equal variances not assumed			1.431	42.862	.160	.73542	.51406	-.30138	1.77222
10 mm	Equal variances assumed	.858	.359	1.615	46	.113	.85542	.52980	-.21102	1.92185
	Equal variances not assumed			1.615	42.488	.114	.85542	.52980	-.21340	1.92424

Table A.48 Comparison of buccolingual alveolar process width (BL) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BL 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	2.486	.122	1.050	46	.299	.59500	.56679	-.54589	1.73589
	Equal variances not assumed			1.050	40.491	.300	.59500	.56679	-.55009	1.74009
4 mm	Equal variances assumed	7.381	.009	2.888	46	.006	1.54333	.53441	.46761	2.61905
	Equal variances not assumed			2.888	34.723	.007	1.54333	.53441	.45810	2.62856
6 mm	Equal variances assumed	5.420	.024	2.406	46	.020	1.36167	.56604	.22230	2.50104
	Equal variances not assumed			2.406	37.996	.021	1.36167	.56604	.21578	2.50755
8 mm	Equal variances assumed	5.431	.024	2.045	46	.047	1.12708	.55126	.01745	2.23671
	Equal variances not assumed			2.045	38.759	.048	1.12708	.55126	.01183	2.24233
10 mm	Equal variances assumed	5.462	.024	1.186	46	.242	.70250	.59256	-.49026	1.89526
	Equal variances not assumed			1.186	41.434	.243	.70250	.59256	-.49382	1.89882

Table A.49 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	2.436	.125	2.190	46	.034	.12292	.05611	.00996	.23587
	Equal variances not assumed			2.190	37.291	.035	.12292	.05611	.00925	.23659
4 mm	Equal variances assumed	.317	.576	-.334	46	.740	-.03500	.10494	-.24623	.17623
	Equal variances not assumed			-.334	45.716	.740	-.03500	.10494	-.24627	.17627
6 mm	Equal variances assumed	.003	.953	-.274	46	.785	-.02917	.10626	-.24306	.18473
	Equal variances not assumed			-.274	45.777	.785	-.02917	.10626	-.24309	.18476
8 mm	Equal variances assumed	.598	.443	-1.546	46	.129	-.17875	.11563	-.41149	.05399
	Equal variances not assumed			-1.546	45.095	.129	-.17875	.11563	-.41162	.05412
10 mm	Equal variances assumed	.498	.484	-1.514	46	.137	-.14125	.09329	-.32903	.04653
	Equal variances not assumed			-1.514	44.823	.137	-.14125	.09329	-.32916	.04666

Table A.50 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 5-6		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	5.160	.028	2.237	46	.030	.16000	.07152	.01604	.30396
	Equal variances not assumed			2.237	35.882	.032	.16000	.07152	.01494	.30506
4 mm	Equal variances assumed	.042	.839	-.316	46	.753	-.02750	.08692	-.20246	.14746
	Equal variances not assumed			-.316	45.653	.753	-.02750	.08692	-.20250	.14750
6 mm	Equal variances assumed	.730	.397	-.723	46	.473	-.07792	.10778	-.29486	.13903
	Equal variances not assumed			-.723	45.613	.473	-.07792	.10778	-.29491	.13908
8 mm	Equal variances assumed	.235	.630	-2.388	46	.021	-.19333	.08096	-.35629	-.03037
	Equal variances not assumed			-2.388	45.440	.021	-.19333	.08096	-.35635	-.03032
10 mm	Equal variances assumed	.889	.351	.259	46	.797	.02875	.11105	-.19478	.25228
	Equal variances not assumed			.259	42.132	.797	.02875	.11105	-.19534	.25284

Table A.51 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the maxilla (left and right sides combined)

Independent Samples Test

Maxilla		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	4.172	.047	.780	46	.440	.07500	.09621	-.11866	.26866
	Equal variances not assumed			.780	35.617	.441	.07500	.09621	-.12019	.27019
4 mm	Equal variances assumed	2.362	.131	-.436	46	.665	-.05167	.11852	-.29023	.18690
	Equal variances not assumed			-.436	43.808	.665	-.05167	.11852	-.29056	.18722
6 mm	Equal variances assumed	.021	.886	-.509	46	.613	-.05292	.10390	-.26205	.15622
	Equal variances not assumed			-.509	45.975	.613	-.05292	.10390	-.26205	.15622
8 mm	Equal variances assumed	.518	.475	.512	46	.611	.06125	.11967	-.17963	.30213
	Equal variances not assumed			.512	44.177	.611	.06125	.11967	-.17990	.30240
10 mm	Equal variances assumed	.050	.824	.245	46	.808	.03333	.13613	-.24068	.30735
	Equal variances not assumed			.245	45.847	.808	.03333	.13613	-.24070	.30737

Table A.52 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the first and second premolars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 4-5		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.055	.815	.532	46	.597	.04792	.09008	-.13341	.22924
	Equal variances not assumed			.532	45.943	.597	.04792	.09008	-.13341	.22924
4 mm	Equal variances assumed	1.399	.243	.991	46	.327	.11792	.11902	-.12165	.35748
	Equal variances not assumed			.991	40.318	.328	.11792	.11902	-.12256	.35840
6 mm	Equal variances assumed	3.078	.086	.168	46	.867	.02167	.12865	-.23728	.28062
	Equal variances not assumed			.168	41.108	.867	.02167	.12865	-.23812	.28145
8 mm	Equal variances assumed	.957	.333	-.016	46	.987	-.00167	.10460	-.21221	.20887
	Equal variances not assumed			-.016	44.449	.987	-.00167	.10460	-.21240	.20907
10 mm	Equal variances assumed	.252	.618	.840	46	.405	.08708	.10363	-.12151	.29567
	Equal variances not assumed			.840	45.719	.405	.08708	.10363	-.12154	.29571

Table A.53 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the second premolar and the first molar at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 5-6		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	.051	.823	.293	46	.771	.03958	.13527	-.23269	.31186
	Equal variances not assumed			.293	45.964	.771	.03958	.13527	-.23270	.31187
4 mm	Equal variances assumed	.728	.398	-.816	46	.419	-.11375	.13943	-.39440	.16690
	Equal variances not assumed			-.816	45.905	.419	-.11375	.13943	-.39442	.16692
6 mm	Equal variances assumed	.678	.415	-.224	46	.823	-.03167	.14107	-.31563	.25230
	Equal variances not assumed			-.224	45.410	.823	-.03167	.14107	-.31573	.25240
8 mm	Equal variances assumed	4.040	.050	.453	46	.653	.07083	.15644	-.24407	.38574
	Equal variances not assumed			.453	38.965	.653	.07083	.15644	-.24561	.38728
10 mm	Equal variances assumed	1.961	.168	.259	46	.797	.04458	.17238	-.30239	.39156
	Equal variances not assumed			.259	42.162	.797	.04458	.17238	-.30324	.39241

Table A.54 Comparison of buccal cortical bone thickness (BC) between Class I and Class II skeletal patterns at between the first and second molars at different vertical heights from the CEJ in the mandible (left and right sides combined)

Independent Samples Test

Mandible		Levene's Test for Equality of Variances		t-test for Equality of Means						
BC 6-7		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
2 mm	Equal variances assumed	7.979	.007	1.505	46	.139	.34750	.23087	-.11722	.81222
	Equal variances not assumed			1.505	34.616	.141	.34750	.23087	-.12138	.81638
4 mm	Equal variances assumed	3.318	.075	1.722	46	.092	.43583	.25316	-.07376	.94543
	Equal variances not assumed			1.722	39.788	.093	.43583	.25316	-.07591	.94758
6 mm	Equal variances assumed	.933	.339	.796	46	.430	.18625	.23410	-.28497	.65747
	Equal variances not assumed			.796	45.191	.430	.18625	.23410	-.28520	.65770
8 mm	Equal variances assumed	1.468	.232	.904	46	.371	.18083	.19996	-.22167	.58334
	Equal variances not assumed			.904	44.480	.371	.18083	.19996	-.22205	.58371
10 mm	Equal variances assumed	4.797	.034	.487	46	.629	.07708	.15836	-.24169	.39585
	Equal variances not assumed			.487	40.403	.629	.07708	.15836	-.24288	.39705

Table A.55 Comparison of mesiodistal distance (MD) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I MD		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	6.682	4	1.670	2.502	.046
	Within Groups	76.788	115	.668		
	Total	83.469	119			
U5-6	Between Groups	45.696	4	11.424	14.679	.000
	Within Groups	89.500	115	.778		
	Total	135.196	119			
U6-7	Between Groups	9.905	4	2.476	4.815	.001
	Within Groups	59.144	115	.514		
	Total	69.049	119			
L4-5	Between Groups	83.228	4	20.807	21.700	.000
	Within Groups	110.270	115	.959		
	Total	193.498	119			
L5-6	Between Groups	51.119	4	12.780	23.019	.000
	Within Groups	63.847	115	.555		
	Total	114.967	119			
L6-7	Between Groups	87.359	4	21.840	20.069	.000
	Within Groups	125.147	115	1.088		
	Total	212.505	119			

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Table A.56 *Post hoc* multiple comparison of mesiodistal distance (MD) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I MD		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	1.6275				
		4 mm	24	1.9988	1.9988			
		8 mm	24		2.1808			
		6 mm	24		2.2488			
		10 mm	24		2.2533			
U5-6	Duncan ^a	2 mm	24	2.2113				
		4 mm	24	2.6250	2.6250			
		6 mm	24		2.8242	2.8242		
		8 mm	24			3.3075		
		10 mm	24				4.0079	
U6-7	Duncan ^a	6 mm	24	1.2371				
		8 mm	24	1.3788				
		2 mm	24	1.4313				
		4 mm	24	1.6000				
		10 mm	24		2.0688			
L4-5	Duncan ^a	2 mm	24	2.5963				
		4 mm	24		3.2742			
		6 mm	24			3.9142		
		8 mm	24			4.4600	4.4600	
		10 mm	24				4.9404	
L5-6	Duncan ^a	2 mm	24	2.2221				
		4 mm	24		2.7096			
		6 mm	24		2.9413			
		8 mm	24			3.4138		
		10 mm	24				4.1413	
L6-7	Duncan ^a	2 mm	24	2.5983				
		4 mm	24	2.9725				
		6 mm	24	3.2142	3.2142			
		8 mm	24		3.8063			
		10 mm	24			5.0417		

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Means for groups in homogeneous subsets are displayed.

Table A.57 Comparison of mesiodistal distance (MD) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II MD		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	17.745	4	4.436	9.578	.000
	Within Groups	53.266	115	.463		
	Total	71.012	119			
U5-6	Between Groups	38.803	4	9.701	8.385	.000
	Within Groups	133.044	115	1.157		
	Total	171.847	119			
U6-7	Between Groups	18.695	4	4.674	5.405	.001
	Within Groups	99.447	115	.865		
	Total	118.143	119			
L4-5	Between Groups	99.157	4	24.789	35.157	.000
	Within Groups	81.085	115	.705		
	Total	180.242	119			
L5-6	Between Groups	49.121	4	12.280	21.680	.000
	Within Groups	65.139	115	.566		
	Total	114.260	119			
L6-7	Between Groups	46.871	4	11.718	7.102	.000
	Within Groups	189.744	115	1.650		
	Total	236.614	119			

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Table A.58 *Post hoc* multiple comparison of mesiodistal distance (MD) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II MD		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	1.7075				
		4 mm	24	2.0158				
		6 mm	24		2.4100			
		8 mm	24		2.5563			
		10 mm	24		2.7796			
U5-6	Duncan ^a	2 mm	24	2.0650				
		4 mm	24	2.5525	2.5525			
		6 mm	24		2.7321			
		8 mm	24		3.0687			
		10 mm	24			3.7725		
U6-7	Duncan ^a	2 mm	24	1.4592				
		6 mm	24	1.7321				
		4 mm	24	1.7429				
		8 mm	24	2.0117				
		10 mm	24		2.6213			
L4-5	Duncan ^a	2 mm	24	2.4683				
		4 mm	24		3.1813			
		6 mm	24			3.9650		
		8 mm	24				4.5088	
		10 mm	24					5.0038
L5-6	Duncan ^a	2 mm	24	2.1179				
		4 mm	24		2.6146			
		6 mm	24		2.8863	2.8863		
		8 mm	24			3.2575		
		10 mm	24				4.0212	
L6-7	Duncan ^a	2 mm	24	2.5283				
		4 mm	24	3.0454	3.0454			
		6 mm	24	3.2650	3.2650			
		8 mm	24		3.7067	3.7067		
		10 mm	24			4.3779		

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Means for groups in homogeneous subsets are displayed.

Table A.59 Comparison of buccolingual alveolar process width (BL) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I BL		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	128.862	4	32.216	20.512	.000
	Within Groups	180.614	115	1.571		
	Total	309.476	119			
U5-6	Between Groups	218.679	4	54.670	28.115	.000
	Within Groups	223.616	115	1.944		
	Total	442.295	119			
U6-7	Between Groups	130.291	4	32.573	13.464	.000
	Within Groups	278.211	115	2.419		
	Total	408.502	119			
L4-5	Between Groups	253.580	4	63.395	24.046	.000
	Within Groups	303.185	115	2.636		
	Total	556.765	119			
L5-6	Between Groups	310.209	4	77.552	35.159	.000
	Within Groups	253.660	115	2.206		
	Total	563.869	119			
L6-7	Between Groups	451.355	4	112.839	20.818	.000
	Within Groups	623.338	115	5.420		
	Total	1074.694	119			

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Table A.60 *Post hoc* multiple comparison of buccolingual alveolar process width (BL) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I BL		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	8.1621				
		4 mm	24		10.4179			
		8 mm	24		10.5621			
		6 mm	24		10.7067			
		10 mm	24		11.0842			
U5-6	Duncan ^a	2 mm	24	9.6950				
		4 mm	24		12.0908			
		6 mm	24		12.4904			
		8 mm	24		12.8121			
		10 mm	24			13.7400		
U6-7	Duncan ^a	2 mm	24	12.6829				
		4 mm	24		14.7600			
		6 mm	24		15.0133			
		8 mm	24		15.3517			
		10 mm	24		15.6137			
L4-5	Duncan ^a	2 mm	24	7.0817				
		4 mm	24		9.2821			
		6 mm	24		10.2025	10.2025		
		8 mm	24			10.7529		
		10 mm	24			11.1746		
L5-6	Duncan ^a	2 mm	24	8.5112				
		4 mm	24		10.5296			
		6 mm	24			11.7521		
		8 mm	24			12.5133	12.5133	
		10 mm	24				12.9988	
L6-7	Duncan ^a	2 mm	24	10.4433				
		4 mm	24		13.3642			
		6 mm	24			14.8608		
		8 mm	24			15.5754		
		10 mm	24			15.5921		

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Means for groups in homogeneous subsets are displayed.

Table A.61 Comparison of buccolingual alveolar process width (BL) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II BL		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	287.450	4	71.862	46.218	.000
	Within Groups	178.810	115	1.555		
	Total	466.260	119			
U5-6	Between Groups	476.066	4	119.017	43.784	.000
	Within Groups	312.599	115	2.718		
	Total	788.665	119			
U6-7	Between Groups	383.986	4	95.996	38.182	.000
	Within Groups	289.127	115	2.514		
	Total	673.113	119			
L4-5	Between Groups	358.587	4	89.647	24.461	.000
	Within Groups	421.467	115	3.665		
	Total	780.054	119			
L5-6	Between Groups	294.107	4	73.527	23.582	.000
	Within Groups	358.565	115	3.118		
	Total	652.672	119			
L6-7	Between Groups	412.609	4	103.152	47.437	.000
	Within Groups	250.070	115	2.175		
	Total	662.679	119			

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Table A.62 *Post hoc* multiple comparison of buccolingual alveolar process width (BL) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II BL		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	7.1213				
		4 mm	24		9.8563			
		6 mm	24		10.5646	10.5646		
		8 mm	24			10.8854		
		10 mm	24				11.6021	
U5-6	Duncan ^a	2 mm	24	8.6504				
		4 mm	24		11.5883			
		6 mm	24			12.5354		
		8 mm	24			13.3125		
		10 mm	24				14.5533	
U6-7	Duncan ^a	2 mm	24	11.4654				
		4 mm	24		14.6642			
		6 mm	24		15.4388	15.4388		
		8 mm	24			15.6650		
		10 mm	24				16.7250	
L4-5	Duncan ^a	2 mm	24	6.1979				
		4 mm	24		8.8567			
		6 mm	24			10.3488		
		8 mm	24			10.6446		
		10 mm	24			10.7958		
L5-6	Duncan ^a	2 mm	24	7.8025				
		4 mm	24		9.9292			
		6 mm	24			11.0733		
		8 mm	24			11.7779	11.7779	
		10 mm	24				12.1433	
L6-7	Duncan ^a	2 mm	24	9.8483				
		4 mm	24		11.8208			
		6 mm	24			13.4992		
		8 mm	24				14.4483	
		10 mm	24				14.8896	

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.63 Comparison of buccal cortical bone thickness (BC) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I BC		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	2.955	4	.739	6.562	.000
	Within Groups	12.946	115	.113		
	Total	15.901	119			
U5-6	Between Groups	1.566	4	.391	3.458	.010
	Within Groups	13.018	115	.113		
	Total	14.584	119			
U6-7	Between Groups	4.335	4	1.084	6.182	.000
	Within Groups	20.158	115	.175		
	Total	24.493	119			
L4-5	Between Groups	15.251	4	3.813	21.429	.000
	Within Groups	20.461	115	.178		
	Total	35.712	119			
L5-6	Between Groups	24.741	4	6.185	19.257	.000
	Within Groups	36.937	115	.321		
	Total	61.678	119			
L6-7	Between Groups	35.800	4	8.950	11.756	.000
	Within Groups	87.551	115	.761		
	Total	123.351	119			

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Table A.64 *Post hoc* multiple comparison of buccal cortical bone thickness (BC) among the different vertical heights (at the same interradicular area) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I BC		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	.7625				
		4 mm	24		.9804			
		8 mm	24		1.0696	1.0696		
		6 mm	24		1.1150	1.1150		
		10 mm	24			1.2308		
U5-6	Duncan ^a	2 mm	24	.8375				
		4 mm	24	.9521	.9521			
		8 mm	24	1.0113	1.0113	1.0113		
		6 mm	24		1.0617	1.0617		
		10 mm	24			1.1817		
U6-7	Duncan ^a	2 mm	24	.8117				
		6 mm	24		1.0750			
		4 mm	24		1.0775			
		8 mm	24		1.2417	1.2417		
		10 mm	24			1.3788		
L4-5	Duncan ^a	2 mm	24	.9558				
		4 mm	24		1.4629			
		6 mm	24		1.6625	1.6625		
		8 mm	24			1.7942	1.7942	
		10 mm	24				2.0037	
L5-6	Duncan ^a	2 mm	24	1.1246				
		4 mm	24	1.4158	1.4158			
		6 mm	24		1.6938			
		8 mm	24			2.0892		
		10 mm	24			2.3904		
L6-7	Duncan ^a	2 mm	24	1.7687				
		4 mm	24		2.4471			
		6 mm	24		2.9338	2.9338		
		10 mm	24			3.1933		
		8 mm	24			3.2129		

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.65 Comparison of buccal cortical bone thickness (BC) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II BC		Sum of Squares	df	Mean Square	F	Sig.
U4-5	Between Groups	7.580	4	1.895	16.401	.000
	Within Groups	13.287	115	.116		
	Total	20.867	119			
U5-6	Between Groups	4.425	4	1.106	11.767	.000
	Within Groups	10.813	115	.094		
	Total	15.238	119			
U6-7	Between Groups	4.806	4	1.202	8.226	.000
	Within Groups	16.798	115	.146		
	Total	21.604	119			
L4-5	Between Groups	15.679	4	3.920	34.839	.000
	Within Groups	12.939	115	.113		
	Total	28.618	119			
L5-6	Between Groups	22.032	4	5.508	25.551	.000
	Within Groups	24.791	115	.216		
	Total	46.823	119			
L6-7	Between Groups	50.900	4	12.725	33.705	.000
	Within Groups	43.417	115	.378		
	Total	94.317	119			

U, Maxilla; L, Mandible

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Table A.66 *Post hoc* multiple comparison of buccal cortical bone thickness (BC) among the different vertical heights (at the same interradicular area) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II BC		height	N	Subset for alpha = 0.05				
				a	b	c	d	e
U4-5	Duncan ^a	2 mm	24	.6396				
		4 mm	24		1.0154			
		6 mm	24		1.1442	1.1442		
		8 mm	24			1.2483	1.2483	
		10 mm	24				1.3721	
U5-6	Duncan ^a	2 mm	24	.6775				
		4 mm	24		.9796			
		6 mm	24		1.1396	1.1396		
		10 mm	24		1.1529	1.1529		
		8 mm	24			1.2046		
U6-7	Duncan ^a	2 mm	24	.7367				
		6 mm	24		1.1279			
		4 mm	24		1.1292			
		8 mm	24		1.1804			
		10 mm	24		1.3454			
L4-5	Duncan ^a	2 mm	24	.9079				
		4 mm	24		1.3450			
		6 mm	24			1.6408		
		8 mm	24			1.7958	1.7958	
		10 mm	24				1.9167	
L5-6	Duncan ^a	2 mm	24	1.0850				
		4 mm	24		1.5296			
		6 mm	24		1.7254			
		8 mm	24			2.0183		
		10 mm	24				2.3458	
L6-7	Duncan ^a	2 mm	24	1.4213				
		4 mm	24		2.0113			
		6 mm	24			2.7475		
		8 mm	24			3.0321		
		10 mm	24			3.1163		

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.67 Comparison of mesiodistal distance (MD) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I MD		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	7.901	2	3.951	11.305	.000
	Within Groups	24.113	69	.349		
	Total	32.014	71			
U 4mm	Between Groups	12.815	2	6.407	12.469	.000
	Within Groups	35.456	69	.514		
	Total	48.270	71			
U 6mm	Between Groups	30.987	2	15.494	26.649	.000
	Within Groups	40.116	69	.581		
	Total	71.103	71			
U 8mm	Between Groups	45.062	2	22.531	32.929	.000
	Within Groups	47.211	69	.684		
	Total	92.274	71			
U 10mm	Between Groups	54.984	2	27.492	24.154	.000
	Within Groups	78.536	69	1.138		
	Total	133.520	71			
L 2mm	Between Groups	2.253	2	1.126	3.484	.036
	Within Groups	22.306	69	.323		
	Total	24.559	71			
L 4mm	Between Groups	3.831	2	1.916	3.887	.025
	Within Groups	34.005	69	.493		
	Total	37.836	71			
L 6mm	Between Groups	12.088	2	6.044	7.940	.001
	Within Groups	52.527	69	.761		
	Total	64.615	71			
L 8mm	Between Groups	13.409	2	6.704	6.082	.004
	Within Groups	76.066	69	1.102		
	Total	89.475	71			
L 10mm	Between Groups	11.677	2	5.839	3.523	.035
	Within Groups	114.360	69	1.657		
	Total	126.037	71			

U, Maxilla; L, Mandible

Table A.68 *Post hoc* multiple comparison of mesiodistal distance (MD) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I MD		area	N	Subset for alpha = 0.05		
				a	b	c
U 2mm	Duncan ^a	6-7	24	1.4313		
		4-5	24	1.6275		
		5-6	24		2.2113	
U 4mm	Duncan ^a	6-7	24	1.6000		
		4-5	24	1.9988		
		5-6	24		2.6250	
U 6mm	Duncan ^a	6-7	24	1.2371		
		4-5	24		2.2488	
		5-6	24			2.8242
U 8mm	Duncan ^a	6-7	24	1.3788		
		4-5	24		2.1808	
		5-6	24			3.3075
U 10mm	Duncan ^a	6-7	24	2.0688		
		4-5	24	2.2533		
		5-6	24		4.0079	
L 2mm	Duncan ^a	5-6	24	2.2221		
		4-5	24		2.5963	
		6-7	24		2.5983	
L 4mm	Duncan ^a	5-6	24	2.7096		
		6-7	24	2.9725	2.9725	
		4-5	24		3.2742	
L 6mm	Duncan ^a	5-6	24	2.9413		
		6-7	24	3.2142		
		4-5	24		3.9142	
L 8mm	Duncan ^a	5-6	24	3.4138		
		6-7	24	3.8063		
		4-5	24		4.4600	
L 10mm	Duncan ^a	5-6	24	4.1413		
		4-5	24		4.9404	
		6-7	24		5.0417	

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.69 Comparison of mesiodistal distance (MD) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II MD		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	4.452	2	2.226	8.775	.000
	Within Groups	17.503	69	.254		
	Total	21.955	71			
U 4mm	Between Groups	8.143	2	4.072	8.075	.001
	Within Groups	34.791	69	.504		
	Total	42.934	71			
U 6mm	Between Groups	12.506	2	6.253	9.324	.000
	Within Groups	46.276	69	.671		
	Total	58.783	71			
U 8mm	Between Groups	13.413	2	6.707	6.469	.003
	Within Groups	71.537	69	1.037		
	Total	84.950	71			
U 10mm	Between Groups	18.691	2	9.345	5.576	.006
	Within Groups	115.651	69	1.676		
	Total	134.341	71			
L 2mm	Between Groups	2.359	2	1.179	4.101	.021
	Within Groups	19.840	69	.288		
	Total	22.199	71			
L 4mm	Between Groups	4.201	2	2.101	4.076	.021
	Within Groups	35.560	69	.515		
	Total	39.761	71			
L 6mm	Between Groups	14.377	2	7.189	9.268	.000
	Within Groups	53.520	69	.776		
	Total	67.898	71			
L 8mm	Between Groups	19.286	2	9.643	6.678	.002
	Within Groups	99.641	69	1.444		
	Total	118.927	71			
L 10mm	Between Groups	11.873	2	5.937	3.215	.046
	Within Groups	127.406	69	1.846		
	Total	139.280	71			

U, Maxilla; L, Mandible

Table A.70 *Post hoc* multiple comparison of mesiodistal distance (MD) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II MD		area	N	Subset for alpha = 0.05		
				a	b	c
U 2mm	Duncan ^a	6-7	24	1.4592		
		4-5	24	1.7075		
		5-6	24		2.0650	
U 4mm	Duncan ^a	6-7	24	1.7429		
		4-5	24	2.0158		
		5-6	24		2.5525	
U 6mm	Duncan ^a	6-7	24	1.7321		
		4-5	24		2.4100	
		5-6	24		2.7321	
U 8mm	Duncan ^a	6-7	24	2.0117		
		4-5	24	2.5563	2.5563	
		5-6	24		3.0687	
U 10mm	Duncan ^a	6-7	24	2.6213		
		4-5	24	2.7796		
		5-6	24		3.7725	
L 2mm	Duncan ^a	5-6	24	2.1179		
		4-5	24		2.4683	
		6-7	24		2.5283	
L 4mm	Duncan ^a	5-6	24	2.6146		
		6-7	24		3.0454	
		4-5	24		3.1813	
L 6mm	Duncan ^a	5-6	24	2.8863		
		6-7	24	3.2650		
		4-5	24		3.9650	
L 8mm	Duncan ^a	5-6	24	3.2575		
		6-7	24	3.7067		
		4-5	24		4.5088	
L 10mm	Duncan ^a	5-6	24	4.0212		
		6-7	24	4.3779	4.3779	
		4-5	24		5.0038	

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.71 Comparison of buccolingual alveolar process width (BL) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I BL		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	253.723	2	126.862	32.526	.000
	Within Groups	269.122	69	3.900		
	Total	522.846	71			
U 4mm	Between Groups	230.214	2	115.107	81.231	.000
	Within Groups	97.776	69	1.417		
	Total	327.990	71			
U 6mm	Between Groups	224.754	2	112.377	102.379	.000
	Within Groups	75.738	69	1.098		
	Total	300.492	71			
U 8mm	Between Groups	275.617	2	137.808	97.618	.000
	Within Groups	97.409	69	1.412		
	Total	373.025	71			
U 10mm	Between Groups	248.652	2	124.326	60.244	.000
	Within Groups	142.397	69	2.064		
	Total	391.049	71			
L 2mm	Between Groups	136.620	2	68.310	18.217	.000
	Within Groups	258.734	69	3.750		
	Total	395.353	71			
L 4mm	Between Groups	210.036	2	105.018	29.602	.000
	Within Groups	244.792	69	3.548		
	Total	454.828	71			
L 6mm	Between Groups	270.125	2	135.062	38.651	.000
	Within Groups	241.114	69	3.494		
	Total	511.238	71			
L 8mm	Between Groups	285.855	2	142.928	46.341	.000
	Within Groups	212.816	69	3.084		
	Total	498.671	71			
L 10mm	Between Groups	236.538	2	118.269	36.639	.000
	Within Groups	222.728	69	3.228		
	Total	459.266	71			

U, Maxilla; L, Mandible

Table A.72 *Post hoc* multiple comparison of buccolingual alveolar process width (BL) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I BL		area	N	Subset for alpha = 0.05		
				a	b	c
U 2mm	Duncan ^a	4-5	24	8.1621	9.6950	12.6829
		5-6	24			
		6-7	24			
U 4mm	Duncan ^a	4-5	24	10.4179	12.0908	14.7600
		5-6	24			
		6-7	24			
U 6mm	Duncan ^a	4-5	24	10.7067	12.4904	15.0133
		5-6	24			
		6-7	24			
U 8mm	Duncan ^a	4-5	24	10.5621	12.8121	15.3517
		5-6	24			
		6-7	24			
U 10mm	Duncan ^a	4-5	24	11.0842	13.7400	15.6137
		5-6	24			
		6-7	24			
L 2mm	Duncan ^a	4-5	24	7.0817	8.5112	10.4433
		5-6	24			
		6-7	24			
L 4mm	Duncan ^a	4-5	24	9.2821	10.5296	13.3642
		5-6	24			
		6-7	24			
L 6mm	Duncan ^a	4-5	24	10.2025	11.7521	14.8608
		5-6	24			
		6-7	24			
L 8mm	Duncan ^a	4-5	24	10.7529	12.5133	15.5754
		5-6	24			
		6-7	24			
L 10mm	Duncan ^a	4-5	24	11.1746	12.9988	15.5921
		5-6	24			
		6-7	24			

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.73 Comparison of buccolingual alveolar process width (BL) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II BL		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	233.075	2	116.537	41.337	.000
	Within Groups	194.524	69	2.819		
	Total	427.599	71			
U 4mm	Between Groups	284.615	2	142.308	114.540	.000
	Within Groups	85.728	69	1.242		
	Total	370.343	71			
U 6mm	Between Groups	288.568	2	144.284	106.593	.000
	Within Groups	93.399	69	1.354		
	Total	381.967	71			
U 8mm	Between Groups	274.155	2	137.078	64.518	.000
	Within Groups	146.601	69	2.125		
	Total	420.756	71			
U 10mm	Between Groups	317.362	2	158.681	42.065	.000
	Within Groups	260.285	69	3.772		
	Total	577.647	71			
L 2mm	Between Groups	160.685	2	80.343	33.868	.000
	Within Groups	163.684	69	2.372		
	Total	324.370	71			
L 4mm	Between Groups	108.120	2	54.060	28.533	.000
	Within Groups	130.729	69	1.895		
	Total	238.849	71			
L 6mm	Between Groups	130.679	2	65.339	20.451	.000
	Within Groups	220.447	69	3.195		
	Total	351.126	71			
L 8mm	Between Groups	183.073	2	91.536	25.085	.000
	Within Groups	251.785	69	3.649		
	Total	434.858	71			
L 10mm	Between Groups	208.931	2	104.466	27.360	.000
	Within Groups	263.456	69	3.818		
	Total	472.388	71			

U, Maxilla; L, Mandible

Table A.74 *Post hoc* multiple comparison of buccolingual alveolar process width (BL) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II BL		area	N	Subset for alpha = 0.05		
				a	b	c
U 2mm	Duncan ^a	4-5	24	7.1213		
		5-6	24		8.6504	
		6-7	24			11.4654
U 4mm	Duncan ^a	4-5	24	9.8563		
		5-6	24		11.5883	
		6-7	24			14.6642
U 6mm	Duncan ^a	4-5	24	10.5646		
		5-6	24		12.5354	
		6-7	24			15.4388
U 8mm	Duncan ^a	4-5	24	10.8854		
		5-6	24		13.3125	
		6-7	24			15.6650
U 10mm	Duncan ^a	4-5	24	11.6021		
		5-6	24		14.5533	
		6-7	24			16.7250
L 2mm	Duncan ^a	4-5	24	6.1979		
		5-6	24		7.8025	
		6-7	24			9.8483
L 4mm	Duncan ^a	4-5	24	8.8567		
		5-6	24		9.9292	
		6-7	24			11.8208
L 6mm	Duncan ^a	4-5	24	10.3488		
		5-6	24	11.0733		
		6-7	24		13.4992	
L 8mm	Duncan ^a	4-5	24	10.6446		
		5-6	24		11.7779	
		6-7	24			14.4483
L 10mm	Duncan ^a	4-5	24	10.7958		
		5-6	24		12.1433	
		6-7	24			14.8896

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.75 Comparison of buccal cortical bone thickness (BC) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

ANOVA

Class I BC		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	.070	2	.035	.326	.723
	Within Groups	7.384	69	.107		
	Total	7.454	71			
U 4mm	Between Groups	.208	2	.104	.929	.400
	Within Groups	7.713	69	.112		
	Total	7.920	71			
U 6mm	Between Groups	.037	2	.018	.144	.866
	Within Groups	8.859	69	.128		
	Total	8.896	71			
U 8mm	Between Groups	.689	2	.344	2.494	.090
	Within Groups	9.531	69	.138		
	Total	10.220	71			
U 10mm	Between Groups	.505	2	.253	1.379	.259
	Within Groups	12.636	69	.183		
	Total	13.141	71			
L 2mm	Between Groups	8.834	2	4.417	10.086	.000
	Within Groups	30.217	69	.438		
	Total	39.051	71			
L 4mm	Between Groups	16.274	2	8.137	15.743	.000
	Within Groups	35.665	69	.517		
	Total	51.939	71			
L 6mm	Between Groups	25.237	2	12.619	29.603	.000
	Within Groups	29.412	69	.426		
	Total	54.649	71			
L 8mm	Between Groups	26.902	2	13.451	35.309	.000
	Within Groups	26.285	69	.381		
	Total	53.187	71			
L 10mm	Between Groups	17.674	2	8.837	26.092	.000
	Within Groups	23.370	69	.339		
	Total	41.044	71			

U, Maxilla; L, Mandible

Table A.76 *Post hoc* multiple comparison of buccal cortical bone thickness (BC) among the different interradicular areas (at the same vertical height) in the patients with Class I skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class I BC		area	N	Subset for alpha = 0.05		
				a	b	c
L 2mm	Duncan ^a	4-5	24	.9558		
		5-6	24	1.1246		
		6-7	24		1.7687	
L 4mm	Duncan ^a	5-6	24	1.4158		
		4-5	24	1.4629		
		6-7	24		2.4471	
L 6mm	Duncan ^a	4-5	24	1.6625		
		5-6	24	1.6938		
		6-7	24		2.9338	
L 8mm	Duncan ^a	4-5	24	1.7942		
		5-6	24	2.0892		
		6-7	24		3.2129	
L 10mm	Duncan ^a	4-5	24	2.0037		
		5-6	24		2.3904	
		6-7	24			3.1933

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

Table A.77 Comparison of buccal cortical bone thickness (BC) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

ANOVA

Class II BC		Sum of Squares	df	Mean Square	F	Sig.
U 2mm	Between Groups	.115	2	.057	1.734	.184
	Within Groups	2.286	69	.033		
	Total	2.401	71			
U 4mm	Between Groups	.293	2	.146	.982	.380
	Within Groups	10.290	69	.149		
	Total	10.583	71			
U 6mm	Between Groups	.003	2	.002	.012	.988
	Within Groups	9.744	69	.141		
	Total	9.748	71			
U 8mm	Between Groups	.057	2	.028	.209	.812
	Within Groups	9.372	69	.136		
	Total	9.429	71			
U 10mm	Between Groups	.686	2	.343	2.573	.084
	Within Groups	9.204	69	.133		
	Total	9.891	71			
L 2mm	Between Groups	3.263	2	1.632	8.168	.001
	Within Groups	13.784	69	.200		
	Total	17.048	71			
L 4mm	Between Groups	5.680	2	2.840	10.729	.000
	Within Groups	18.263	69	.265		
	Total	23.943	71			
L 6mm	Between Groups	18.212	2	9.106	29.976	.000
	Within Groups	20.961	69	.304		
	Total	39.173	71			
L 8mm	Between Groups	20.844	2	10.422	46.892	.000
	Within Groups	15.336	69	.222		
	Total	36.180	71			
L 10mm	Between Groups	17.734	2	8.867	47.785	.000
	Within Groups	12.803	69	.186		
	Total	30.537	71			

U, Maxilla; L, Mandible

Table A.78 *Post hoc* multiple comparison of buccal cortical bone thickness (BC) among the different interradicular areas (at the same vertical height) in the patients with Class II skeletal pattern (left and right sides combined)

Homogeneous Subsets

Class II BC		area	N	Subset for alpha = 0.05		
				a	b	c
L 2mm	Duncan ^a	4-5	24	.9079		
		5-6	24	1.0850		
		6-7	24		1.4213	
L 4mm	Duncan ^a	4-5	24	1.3450		
		5-6	24	1.5296		
		6-7	24		2.0113	
L 6mm	Duncan ^a	4-5	24	1.6408		
		5-6	24	1.7254		
		6-7	24		2.7475	
L 8mm	Duncan ^a	4-5	24	1.7958		
		5-6	24	2.0183		
		6-7	24		3.0321	
L 10mm	Duncan ^a	4-5	24	1.9167		
		5-6	24		2.3458	
		6-7	24			3.1163

U, Maxilla; L, Mandible

Means for groups in homogeneous subsets are displayed.

APPENDIX B

ใบยินยอม เข้าร่วมโครงการวิจัย (Informed consent)

1. โครงการวิจัยเรื่อง

การเปรียบเทียบแบบสามมิติบริเวณระหว่างรากฟัน และความหนาของกระดูกทึบในผู้ป่วยไทย ที่มีโครงขากรรไกรแบบที่ I กับแบบที่ II โดยใช้โคนบีมคอมพิวเตอร์โทโมกราฟี

ท่าน/บุตรของท่านกำลังถูกทาบถาม เพื่ออนุญาตให้ท่าน/บุตรของท่านเข้าร่วมในโครงการวิจัย เรื่องดังกล่าวข้างต้น ก่อนที่ท่านจะตัดสินใจว่าจะเข้าร่วมโครงการวิจัยนี้ เราต้องการจะอธิบายให้ท่าน ทราบถึงวัตถุประสงค์ของการวิจัย อันตรายที่ท่าน/บุตรของท่านจะได้รับ และสิ่งที่เราคาดหวังจาก ท่าน เมื่อท่านตัดสินใจให้บุตรของท่านเข้าร่วมโครงการวิจัย

เมื่อท่านตกลงใจที่จะให้บุตรของท่านเข้าร่วมโครงการ เราจะขอให้ท่านเซ็นชื่อ ในใบยินยอม ต่อหน้าบุคคลซึ่งเป็นพยาน

การเข้าร่วมโครงการวิจัยนี้ จะขึ้นอยู่กับความสมัครใจของท่าน/บุตรของท่าน ไม่มีการบังคับ ท่านอาจตัดสินใจที่จะไม่ให้บุตรของท่านเข้าร่วมโครงการ หรือถอนออกจากโครงการเวลาใดก็ได้ โดยท่าน/บุตรของท่านจะไม่สูญเสียประโยชน์เกี่ยวกับการดูแลรักษาตามมาตรฐาน

2. วัตถุประสงค์ของโครงการ

2.1 เพื่อประเมินลักษณะบริเวณระหว่างรากฟันแบบสามมิติและความหนาของกระดูกทึบใน ผู้ป่วยไทยที่มีโครงขากรรไกรแบบที่ I หรือแบบที่ II โดยใช้โคนบีมคอมพิวเตอร์โทโม กราฟี

2.2 เพื่อเปรียบเทียบลักษณะบริเวณระหว่างรากฟันแบบสามมิติและความหนาของกระดูก ทึบในผู้ป่วยไทยที่มีโครงขากรรไกรแบบที่ I หรือแบบที่ II โดยใช้โคนบีมคอมพิวเตอร์ โทโมกราฟี

3. วิธีการ

ถ้าท่าน/บุตรของท่านตกลงใจจะให้บุตรของท่านเข้าร่วมโครงการวิจัยนี้ ภายหลังจากท่านได้เซ็นยินยอมการเข้าร่วมโครงการแล้ว ท่าน/บุตรของท่านจะได้รับการการถ่ายภาพรังสีแบบโคนบีมคอมพิวเตอร์โทโมกราฟีบริเวณขากรรไกรบนและขากรรไกรล่าง

4. ความเสี่ยง, ความไม่สวยงาม หรือความไม่สบายต่างๆที่อาจเกิดขึ้น

ปริมาณรังสีที่ได้รับจะมากกว่าการถ่ายภาพรังสีแบบปกติ แต่อยู่ในระดับที่ปลอดภัย

5. ประโยชน์ที่คาดว่าจะได้รับ

- 5.1 การวางแผนการรักษาที่ง่ายขึ้น ลดโอกาสการเกิดความล้มเหลวในการใช้วัสดุฝังเกลียวขนาดเล็กเกี่ยวกับการจัดฟัน และลดความเสี่ยงที่วัสดุฝังเกลียวขนาดเล็กจะทำลายรากฟันบริเวณข้างเคียงเมื่อทำการปักจริง
- 5.2 ได้รับการงดเว้นการถ่ายภาพรังสีแบบรอบปลายรากฟัน (ซึ่งเป็นขั้นตอนตามปกติสำหรับการวางแผนการรักษาทางทันตกรรมจัดฟัน) เนื่องจากสามารถใช้ภาพจากโคนบีมซีทีในการอ่านผลแทนได้

6. ค่าใช้จ่าย

ผู้ป่วยที่เข้าร่วมโครงการวิจัยจะได้รับค่าชดเชยจากการถ่ายภาพรังสีแบบโคนบีมซีที โดยนำไปหักกับค่าใช้จ่ายในส่วนของการจัดฟันปกติเท่ากับจำนวนค่าใช้จ่ายในการถ่ายภาพรังสีโคนบีมซีที

7. บุคคลที่ท่านสามารถติดต่อเมื่อมีปัญหาหรือคำถามเกี่ยวกับโครงการวิจัยนี้

หากท่านมีปัญหาหรือคำถามเกี่ยวกับโครงการวิจัยนี้ท่านสามารถติดต่อ ทพญ.ณัฐธิดา คำสาร และ/หรือ รศ.ทพ.วิรัช พัฒนากรณ์ ภาควิชาทันตกรรมจัดฟัน คณะทันตแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ โทร 0-5394-4464 นอกเวลาราชการ โทร 08-2612-2920

เมื่อท่านได้อ่านใบยินยอมหรือมีผู้อ่านและอธิบายใบยินยอมนี้ให้ท่านฟัง และท่านเข้าใจแล้ว และสมัครใจที่จะเข้าร่วมโครงการวิจัยนี้ กรุณาเซ็นชื่อของท่านข้างล่างนี้

ลายมือชื่ออาสาสมัคร/ผู้ปกครอง _____ วัน-เดือน-ปี _____
()

ลายมือชื่อผู้ให้ข้อมูลการวิจัย _____ วัน-เดือน-ปี _____
(_____)

พยาน _____ วัน-เดือน-ปี _____
(_____)



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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APPENDIX C

Certificate of ethical clearance


เอกสารเลขที่...๑๔./๒๕๕๖

เอกสารรับรองโครงการศึกษาวิจัยในมนุษย์
โดย
คณะกรรมการพิทักษ์สิทธิสวัสดิภาพและป้องกันอันตรายของผู้ถูกวิจัย
คณะทันตแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่
ขอรับรองว่า

โครงการวิจัย : การเปรียบเทียบแบบสามมิติบริเวณระหว่างรากฟัน และความหนา
ของกระดูกทึบในผู้ป่วยไทยที่มีโครงขากรรไกรแบบที่ I กับแบบที่ II
โดยใช้โคนบีบคอมพิวเตอร์โมดูลโมกราฟี

หัวหน้าโครงการวิจัย : ทันตแพทย์หญิง ณัฐธิดา คำสาร

สังกัด : คณะทันตแพทยศาสตร์
มหาวิทยาลัยเชียงใหม่

ได้รับการพิจารณาโครงการแล้ว เห็นว่าไม่ขัดต่อสิทธิสวัสดิภาพและก่อให้เกิด
อันตรายแก่ผู้ถูกวิจัยแต่ประการใด

จึงเห็นสมควรให้ดำเนินการวิจัยในขอบข่ายของโครงการที่เสนอได้

ณ วันที่ ๑๔ พฤษภาคม ๒๕๕๖

(ลงชื่อ) 
(ศาสตราจารย์ ทันตแพทย์ ดร. อดิษฐ์ เขียวมอรุณ)
ประธานคณะกรรมการพิทักษ์สิทธิสวัสดิภาพและป้องกันอันตรายของผู้ถูกวิจัย

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คณบดี คณะทันตแพทยศาสตร์

APPENDIX D

Proceedings: International Graduate Research Conference 2013

iGRC2013

Chiang Mai University, THAILAND

PROCEEDINGS: International Graduate Research Conference 2013

20 December 2013

Evaluation of Three Dimensional Interradicular Areas and Cortical Bone Thickness for Orthodontic Miniscrew Implant Placement in Thai Patients with Class I Skeletal Pattern Using Cone Beam Computed Tomography

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Chiang Mai University, Thailand

Abstract

Purposes: To evaluate the three dimensional interradicular areas and the cortical bone thickness in Thai patients with Class I skeletal pattern and to determine the safe and suitable sites for orthodontic miniscrew implant using Cone Beam Computed Tomography (CBCT).

Materials and Methods: CBCT images of 12 pretreatment Thai orthodontic patients with Class I skeletal pattern were examined. Measurements were made from the distal aspect of the first premolar to the mesial aspect of the second molar of maxilla and mandible, at 2, 4, 6, 8, and 10 mm heights from the cemento-enamel junction (CEJ) in each interradicular area.

Results: In the maxilla, the greatest mesiodistal distance was between the second premolar and first molar at 10-mm height (4.01 ± 1.27 mm). The greatest buccolingual alveolar process width and buccal cortical thickness were between the first and second molar at 10-mm height (15.61 ± 1.07 and 1.38 ± 0.48 mm, respectively). In the mandible, the greatest mesiodistal distance and buccolingual alveolar process width were between the first and second molar at 10-mm height (5.04 ± 1.51 mm and 15.59 ± 2.37 mm, respectively). The greatest buccal cortical thickness was between the first and second molar at 8-mm height (3.21 ± 0.75 mm).

Conclusion: In the maxilla, the safe and suitable site for placing miniscrew implant was between the second premolar and first molar. In the mandible, the safe and suitable sites are the interradicular areas from the first premolar to the second molar.

Keywords

Interradicular Areas, Cortical Bone Thickness, Miniscrew Implant Placement, CBCT

Introduction

To achieve excellent results during orthodontic treatment, adequate control of anchorage is necessary.¹ The patients with bimaxillary dentoalveolar protrusion demonstrated protrusive and proclined upper and lower incisors and an increased procumbency of the lips. The primary goals of orthodontic treatment of these patients include retraction and retroclination of maxillary and mandibular

incisors with a resultant decrease in soft tissue procumbency and convexity. This is most commonly achieved by orthodontic treatment in combination with extraction of four first premolars, and retraction of anterior teeth using maximum anchorage mechanics.² Recently, the use of miniscrew implants to obtain absolute anchorage has become very popular, because of the small size, uncomplicated

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surgical procedure, immediate load, lower medical cost, minimal patient cooperation, and multiple insertion positions.^{1, 3, 4} The buccal interradicular area is commonly selected for miniscrew implant placement.⁵⁻⁷ This area is not only easy for miniscrew implant placement, but also allows relatively simple orthodontic mechanics.^{6, 8}

Two factors that clinicians should consider during miniscrew implant placement are safety and stability. Safety is related to avoiding anatomical damage during miniscrew implant placement or when teeth are displaced.^{1, 9} The insertion of a miniscrew implant in this buccal interradicular area carries a risk that the miniscrew implant may damage anatomic structures, such as the dental roots, maxillary sinus, nasal cavity, blood vessels, and nerves.⁹⁻¹¹ Stability, which plays a major role in preventing premature loosening and dislodging of the miniscrew implants, is influenced significantly by cortical bone thickness at the miniscrew implant placement site.^{1, 9, 12}

To prevent damage to the dental root, Poggio *et al.*¹³ recommended a minimum clearance of 1.0 mm of alveolar bone around the miniscrew implant in order to provide periodontal health. Therefore, the mesiodistal distance above 3.1 mm was safe for placement of miniscrew with a maximum diameter of 1.2–1.3 mm. The miniscrew implant with a 1.5-mm diameter required at least 3.5 mm of space. Monnerat *et al.*¹¹ determined the risk for miniscrew implant placement by the mesiodistal distance. Any areas above 3.5 mm can be considered safe; between 3.0 and 3.5 mm, the risk is average; and below 3.0 mm, the risk is high. Moreover, Poggio *et al.*¹³ suggested that it should not be embedded for more than 6–8 mm of

buccolingual alveolar process width because it might reach the narrowest interradicular space. In maxillary molar region, the implantation of miniscrew implant more than 8.0 mm above the alveolar crest or 9.5 mm above the cemento-enamel junction (CEJ) should be careful because of the presence of the maxillary sinus.¹³ The mental foramen is usually located between the apices of the mandibular premolars.¹⁴ Therefore, the caution is advised when placing miniscrew implant in this area, particularly starting at the height of 9 mm from the alveolar crest or 10.5 from CEJ.¹¹ The cortical bone thickness is related to the stability of miniscrew implant. To achieve successful implantation, Motoyoshi *et al.*¹⁵ suggested that the prepared site should be established in an area with a cortical bone thickness of more than 1.0 mm. Many studies have evaluated the dimensions and cortical bone thickness of the interradicular space for miniscrew implant placement, but the results are varied.^{5-7, 9, 11, 13} Moreover, the three-dimensional study of the buccal interradicular area in Thais has not yet been investigated.

The purposes of this study, therefore, were to evaluate the three dimensional interradicular areas and the cortical bone thickness in Thai patients with Class I skeletal pattern using CBCT images, and to determine the safe and suitable sites for orthodontic miniscrew implant placement.

Methodology/Experimental design

This study was approved by the Human Experimentation Committee, Faculty of Dentistry, Chiang Mai University. Informed consent was obtained from all patients.

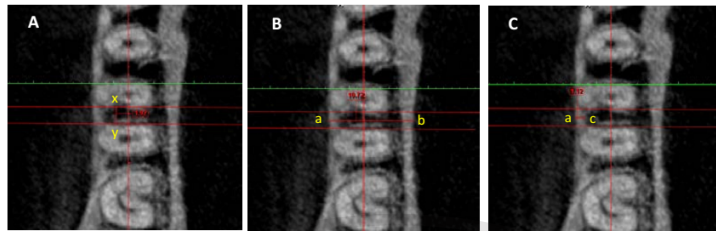


Fig 1. A, Measurement of the mesiodistal distance of the interradicular space (x-y); B, the buccolingual alveolar process width (a-b); C, the buccal cortical bone thickness (a-c)

Samples

Twelve pretreatment Thai orthodontic patients (four males and eight females; aged 18.25 ± 2.83 years; ranged from 13 to 22 years), who met the following criteria: (1) full eruption of permanent dentition (except for third molars); (2) no history of previous orthodontic treatment; (3) no missing teeth (exclude third molars); (4) No severe craniofacial disorders; (5) no severe periodontitis or periapical lesion; (6) no large metal restoration; (7) no severe crowding and spacing in posterior teeth; and (8) Class I skeletal pattern (ANB angle = $2^\circ \pm 2^\circ$) and orthodontic treatment planning requires miniscrew implant placement, were selected. All patients were images with CBCT with a ProMax 3D (Planmeca OY, Helsinki, Finland) CBCT unit, at 8 cm field of view, 84 kVp, and 10 mA. Each patient was positioned at the device, keeping the occlusal plane parallel to the floor. Orthogonal tomographic images were constructed using the Planmeca Romexis Viewer software (Planmeca OY, Helsinki, Finland).

Measurements

All images were oriented using a standardized protocol. On the axial image, the CBCT image was oriented until the green line supplied by the software was perpendicular to the buccal bone surface and bisects the interradicular area to be measured. On the sagittal image, the CBCT

image was oriented until the occlusal plane is parallel to the blue line. The cursor was adjusted until the red line in the axial image was centered on each contact area, at approximately the midroot level. For each interradicular area in the maxilla and the mandible, from the distal aspect of the first premolar to the mesial aspect of the second molar of maxilla and mandible, the following measurements were done at five different heights from the CEJ, that was, at 2, 4, 6, 8, and 10 mm.

- Mesiodistal distance (MD): This distance was defined as the distance between parallel lines tangent to the adjacent proximal root surfaces in the axial image (Fig 1, A).
- Buccolingual alveolar process width (BL): This width was measured at the center of the interradicular width between the tangent lines to the proximal root surfaces, from the outermost point on the buccal side to the outermost point on the palatal/lingual side (Fig 1, B).
- Buccal cortical bone thickness (B-C): This thickness was the distance between the external and internal aspects of the buccal cortex midway between the tangent lines to the proximal root surfaces (Fig 1, C).

For each patient, 180 measurements were measured and performed by one investigator. The CBCT images of 5 patients were randomly selected and re-measured by the same examiner after a 4-

week interval to test for intra-observer reliability.

Statistical analysis

The data were analyzed using the SPSS version 16.0 for windows. The significance level for all the tests was set at $P < .05$. Paired t-test was used to determine the intra-observer reliability and there was no significant difference between the repeated measurements. Unpaired t-test was used to analyze differences between measurements of the right and the left side. No significant differences were found, so the measurements were pooled to facilitate determining central trend measurements. Descriptive analysis was used to obtain the means and standard deviations (SD) of all measurements.

Results and Discussion

Results

The means and standard deviations of the mesiodistal distance, buccolingual alveolar process width, and buccal cortical bone thickness of the maxilla and mandible are shown in Table I.

In the maxilla

The greatest mesiodistal distance was between the second premolar and first molar at 10-mm height (4.01 ± 1.27 mm). The greatest buccolingual alveolar process width and buccal cortical thickness were between the first and second molar at 10-mm height (15.61 ± 1.07 and 1.38 ± 0.48 mm, respectively). As described by Poggio *et al.*¹³ and Monnerat *et al.*¹¹, the safe site for placing miniscrew implant in the maxilla of our study is between the second premolar and first molar at 10-mm height (4.01 ± 1.27 mm), however it should be careful about maxillary sinus position at this height. The average risk site is between the second premolar and first molar at 8-mm height

(3.31 ± 0.90 mm), that is suitable for 1.2-1.3-mm diameter of miniscrew implant.

These data show that, for all variables, the measurements are gradually increased from cervical area to apical area. Small variations from this trend were observed between the first premolar and second premolar at the 8-mm height (for MD, BL, B-C), the second premolar and first molar at the 8-mm height (for B-C), and the first molar and second molar at the 6-mm and 8-mm height (for MD) which were less amount than the height above them. The buccolingual alveolar process width increases from the anterior to posterior regions.

In the mandible

The greatest mesiodistal distance was between the first and second molar at 10-mm height (5.04 ± 1.51 mm). The greatest buccolingual alveolar process width was between the first and second molar at 10-mm height (15.59 ± 2.37 mm). The greatest buccal cortical thickness was between the first and second molar at 8-mm height (3.21 ± 0.75 mm).

As described by Poggio *et al.*¹³ and Monnerat *et al.*¹¹, the safe sites are between the first and second premolar at 6, 8, and 10-mm height (3.91 ± 1.00 , 4.46 ± 1.15 , and 4.94 ± 1.20 mm, respectively), between the second premolar and first molar at 10-mm height (4.14 ± 1.13 mm), and between the first and second molar at 8 and 10-mm height (3.81 ± 1.16 and 5.04 ± 1.51 mm, respectively). However should be careful about the mental foramen position between the first and second premolar. The average risk sites are between the first and second premolar at 4-mm height (3.27 ± 0.80 mm), between the second premolar and first molar at 8-mm height (3.41 ± 0.80 mm), and between the first and second molar at 6-mm height (3.21 ± 0.94 mm).

Table I. Means and standard deviations of measurements of the mesiodistal distance, buccolingual alveolar process width, and buccal cortical bone thickness of the maxilla and the mandible

Area	Height (mm)	Maxilla						Mandible					
		4-5		5-6		6-7		4-5		5-6		6-7	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
MD	2	1.63	0.61	2.21	0.55	1.43	0.61	2.60	0.63	2.22	0.42	2.60	0.63
	4	2.00	0.75	2.63	0.73	1.60	0.67	3.27*	0.80	2.71	0.54	2.97	0.74
	6	2.25	0.82	2.82	0.80	1.24	0.65	3.91**	1.00	2.94	0.63	3.21*	0.94
	8	2.18	0.89	3.31*	0.90	1.38	0.68	4.46**	1.15	3.41*	0.80	3.81**	1.16
	10	2.25	0.97	4.01**	1.27	2.07	0.93	4.94**	1.20	4.14**	1.13	5.04**	1.51
BL	2	8.16	1.75	9.70	1.46	12.68	2.55	7.08	1.88	8.51	1.56	10.44	2.30
	4	10.42	0.95	12.09	0.98	14.76	1.55	9.28	1.90	10.53	1.28	13.36	2.32
	6	10.71	0.84	12.49	1.20	15.01	1.08	10.20	1.63	11.75	1.49	14.86	2.37
	8	10.56	1.01	12.81	1.53	15.35	0.95	10.75	1.31	12.51	1.52	15.58	2.29
	10	11.08	1.47	13.74	1.70	15.61	1.07	11.17	1.29	13.00	1.55	15.59	2.37
B-C	2	0.76	0.24	0.84	0.31	0.81	0.41	0.96	0.31	1.12	0.46	1.77	1.00
	4	0.98	0.35	0.95	0.29	1.08	0.36	1.46	0.48	1.42	0.49	2.45	1.04
	6	1.12	0.36	1.06	0.36	1.08	0.36	1.66	0.52	1.69	0.52	2.93	0.86
	8	1.07	0.37	1.01	0.26	1.24	0.45	1.79	0.39	2.09	0.65	3.21	0.75
	10	1.23	0.35	1.18	0.44	1.38	0.48	2.00	0.37	2.39	0.68	3.19	0.64

4-5, between first and second premolars; 5-6, between second premolar and first molar; 6-7, between first and second molars; *Average risk site; **safe site

These data show that, for all variables, the measurements are generally increased from cervical area to apical area. A small variation from this trend was observed between the first molar and second molar at the 10-mm height (for B-C) which was less thick than the height above it. The buccolingual width and buccal cortical thickness increase from the anterior to posterior regions. A small variation from this trend was observed between the second premolar and first molar at the 4-mm height (for B-C) which was less thick than the area between the first and second premolars.

Discussion

This study determines the interradicular areas in the maxillary and mandibular posterior regions for safe and

suitable orthodontic miniscrew implant placement. In the maxilla, we reported the greatest mesiodistal distance was between the maxillary second premolar and first molar. According to the Table II, this result agreed with those obtained in previous studies of both 2D and 3D method.^{5, 8, 9, 16} However, they are different from the study of Poggio *et al.*¹³, probably due to the difference in the method of measurement in these studies.

In the mandible, we reported the greatest mesiodistal distance was located between the first and second molar. According to the Table II, this result agreed with those obtained in previous studies of both 2D and 3D method.^{8, 9, 11} However, they are different from the studies in CBCT method of Poggio *et al.*¹³ and Fayed *et al.*⁵, probably due to

Table II. Summary of articles identifying the greatest mesiodistal distance in the interradicular areas

Author	Method	Maxilla	Mandible
Poggio <i>et al.</i> , 2006	CBCT	4-5 B, 5-6 P	4-5
Park and Cho, 2009	CBCT	5-6	6-7
Fayed <i>et al.</i> , 2010	CBCT	5-6 B, P	5-6 B, 4-5 L
Monnerat <i>et al.</i> , 2009	CT	-	6-7
Chaimanee <i>et al.</i> , 2011	Periapical radiograph	5-6	6-7
Schnelle <i>et al.</i> , 2004	Panoramic radiograph	5-6	5-6, 6-7
Our study	CBCT	5-6	6-7

4-5, between first and second premolars; 5-6, between second premolar and first molar; 6-7, between first and second molars; B, buccal side; P, palatal side; L, lingual side

difference in the method of measurement in these studies. Moreover, the vertical and horizontal magnifications are inherent in panoramic radiography, as the method of Schnelle *et al.*¹⁶, the result from this study is different.

According to the Table I, the sites of safe and average risk of miniscrew implant placement are more than 6–8 mm of buccolingual alveolar process width and more than 1.0 mm of cortical bone thickness, that are enough as Poggio *et al.*¹³'s and Motoyoshi *et al.*¹⁵'s suggestion.

Stability is influenced significantly by cortical bone thickness at the miniscrew implant placement site. In addition, the bone quality (bone mineral density) and the presence of attached gingiva are factors influence stability.^{1,9} These factors should be studied further.

Conclusions

In the maxilla, the safe and suitable site for placing miniscrew implant was located between the second premolar and first molar at 10-mm height; however, the clinician should be careful about maxillary sinus position. The site of average risk was located between the second premolar and first molar at 8-mm height, that was suitable for 1.2-1.3-mm diameter of miniscrew implant.

In the mandible, the safe and suitable sites were located between the first and second premolar at 6, 8, 10-mm height, between the second premolar and first molar at 10-mm height, and between the first and second molar at 8, 10-mm height. However the clinician should be careful about the mental foramen position between the first and second premolar. The sites of average risk were located between the first and second premolar at 4-mm height, between the second premolar and first molar at 8-mm height, and between the first and second molar at 6-mm height.

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