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Immediate Implants - buccal bone thickness and root anatomy With CBCT analysis

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Introduction:

The Immediate implants protocol has advantages such as morbidity reduction and treatment duration. It is necessary an improved knowledge of both the root anatomy and the bone typography through the CBCT method for the success of this type of technique.

Objectives:

To quantify the buccal bone thickness and root anatomy in cases subject to immediate implants.

Materials and methods:

403 CBCT images (208 upper teeth, 195 lower) of 49 patients from the Faculty of Dentistry of Seville, during the course of 2014.

The thickness of the vestibular wall is measured in 3 points (A: crest, B: 4mm from point A, C: vertex).
The second parameter is the angle formed by the axis of the basal bone with the axis of the tooth.

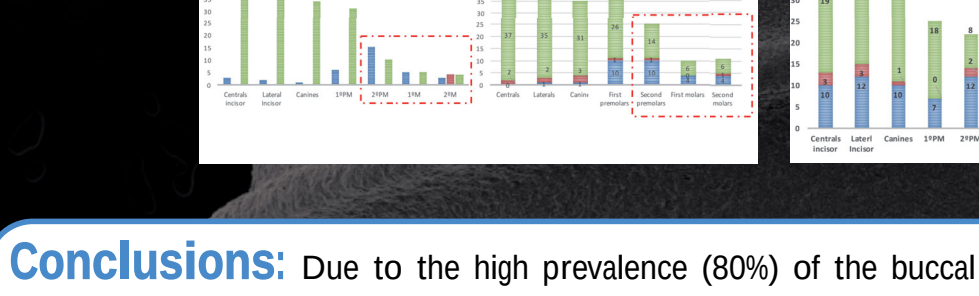


Table 1: Systemic inclusion criteria	Local exclusion criteria
1. Absence of: systemic disease of relevant history of bad health (particularly ruling out bone diseases, uncontrolled or poorly controlled diabetes, unstable or life-threatening conditions or requiring antibiotics prophylaxis). 2. Absence of history of radiotherapy or chemotherapy in the past 5 years. 3. Absence of autoimmune diseases and any drug use. 4. Absence of pregnancy or lactation.	1. Radiolucent imagen greater than 1/3 of the root. 2. Severe root angulation (selected teeth image isn't contained in slice). 3. Severe root resorption. 4. Radiographic evidence of surgical (guided bone/tissue regeneration)treatment.

Results:

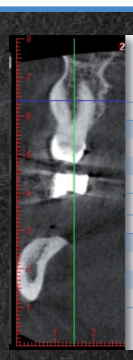
Maxilla: 89.4% of the incisors, 93.94% of the canines, 78% of the premolars and 70.5% of the molars have a thickness of the buccal bone inferior to 2 mm.

Mandible: 73.5% of incisors, 49% of canines, 64% of premolars and 53% of molars have <1 mm measured at point B.

Average Angle: Maxilla: incisors 11.67 ± 6.37º, canines 16.88 ± 7.93º, premolars 13.93 ± 8.6º, and molars 9.89 ± 4.8º. Jaw: incisors 10.63 ± 8.76 °, canines 10.98 ± 7.36 °, premolars 10.54 ± 5.82 °, molars 16.19 ± 11.22 °.

RESULTS
SAMPLE SIZE:

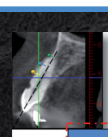
RESULTS
Thickness of alveolar buccal bone



Maxilla	Sample	A	B	C
Incisives	66	1,04 ± 0,46mm	1,02 ± 0,49mm	1,62 ± 0,95mm
Canines	33	1,05 ± 0,39mm	1,27 ± 1,95mm	1,26 ± 1,68mm
Premolars	50	1,20 ± 0,67mm	1,43 ± 0,95mm	2,19 ± 1,68mm
Molars	59	1,24 ± 0,84mm	1,55 ± 1,4mm	2,15 ± 1,68mm

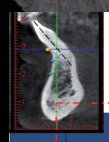
Mandible	Sample	A	B	C
Molar	21	0,92 ± 0,42mm	3,11 ± 2,03mm	6,78 ± 2,93mm
Premolar	62	0,84 ± 0,40mm	1,49 ± 0,97mm	3,81 ± 1,83mm
Canines	35	0,79 ± 0,4mm	1,08 ± 0,86mm	3,53 ± 1,87mm
Incisives	77	0,77 ± 0,36mm	0,94 ± 0,77mm	3,19 ± 1,91mm

RESULTS
Thickness of alveolar buccal bone **maxilla**



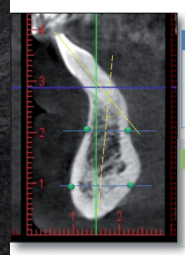
	<1mm			1-2mm			>2mm		
Dental Group	A	B	C	A	B	C	A	B	C
Incisors (C, L)	35 (53-53%)	32 (53-44%)	15 (13-32%)	26 (38-41%)	31 (44-50%)	34 (59-44%)	6 (9-6%)	3 (3-6%)	17 (28-24%)
Canines	18 (45%)	19 (58%)	2 (3%)	12 (30%)	13 (39%)	17 (52%)	3 (8%)	1 (3%)	4 (12%)
Pm (1º, 2º)	20 (54-24%)	18 (46-16%)	2 (36-12%)	27 (42-64%)	21 (46-48%)	15 (28-32%)	4 (4-12%)	10 (6-32%)	25 (36-56%)
M (1º, 2º)	25 (45-32%)	28 (55-39%)	9 (48-14%)	25 (45-39%)	13 (23-21%)	15 (26-25%)	11 (10-29%)	18 (23-39%)	25 (26-61%)

RESULTS
Thickness of alveolar buccal bone MANDIBLE



	< 1mm			1-2mm			> 2mm		
Dental Group	A	B	C	A	B	C	A	B	C
Incisors (central, lateral)	57 (79-68%)	47 (62-61%)	5 (5-8%)	20 (21-32%)	26 (33-34%)	18 (31-16%)	0	4 (5-5%)	54 (64-76%)
Canines	17 (49%)	15 (43%)	3 (9%)	2 (6%)	16 (46%)	6 (17%)	16 (46%)	4 (11%)	26 (74%)
Premolars(1ºPM, 2ºPM)	40 (68-60%)	23 (46-24%)	2 (50%)	22 (32-40%)	23 (35-40%)	4 (5-8%)	0	16 (19-36%)	54 (84-92%)
Molars(1ºM,2ºM)	11 (70-36%)	0	0	10 (30-64%)	9 (80-9%)	0	0	12 (20-91%)	21 (100-100%)

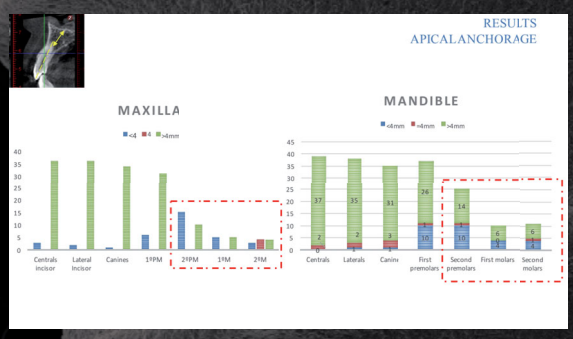
RESULTS
The angulation between the axis of the teeth and the alveolar process



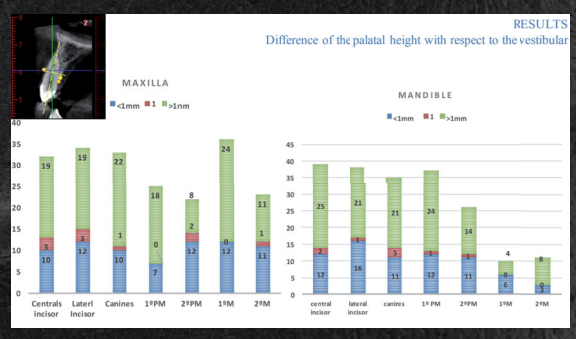
Maxilla	Sample	Medium	Minimum	Maximum
Incisors	66	11,67 ± 6,37º	0,70º	27,01º
Canines	33	16,88 ± 7,93º	2,18º	34,20º
Premolars	50	13,93 ± 8,6º	0,33º	42,60º
Molars	58	9,89º ± 4,8º	2,13º	20,90º

Mandible	Sample	Medium	Minimum	Maximum
Incisors	77	10.64±8º	1.06º	38.00º
Canines	35	10.99±14º	2.00º	32.78º
Premolars	62	10.54±5º	2.05º	25.35º
Molars	21	16.19±1.2º	2.81º	43.26º

RESULTS
APICAL ANCHORAGE



RESULTS
Difference of the palatal height with respect to the vestibular



Conclusions:

Due to the high prevalence (80%) of the buccal bone inferior to 2mm it is advisable to perform additional regeneration procedures for tissue preservation.

Literature:

PAgostinelli C, Agostinelli A, Berardini M, Trisi P. Anatomical and Radiologic Evaluation of the Dimensions of Upper Molar Alveoli.Implant Dent. 2018 Mar 19.

Kan JY1, Roe P, Rungcharassaeng K, Patel RD, Waki T, Lozada JL, Zimmerman G. Classification of sagittal root position in relation to the anterior maxillary osseous housing for immediate implant placement: a cone beam computed tomography study. Int J Oral Maxillofac Implants. 2011 Jul-Aug;26(4):873-6.

Sendyk, M., de Paiva, J. B., Abrao, J., & Rino Neto, J. (2017). Correlation between buccolingual tooth inclination and alveolar bone thickness in subjects with Class III dentofacial deformities. Am J Orthod Dentofacial Orthop, 152(1), 66-79.

Agostinelli C, Agostinelli A, Berardini M, Trisi P.Anatomical and Radiologic Evaluation of the Dimensions of Upper Molar Alveoli. Implant Dent. 2018 Mar 19. Braut V, Bornstein MM, Belser U, Buser D.Thickness of the anterior maxillary facial bone wall-a retrospective radiographic study using cone beam computed tomography.Int J Periodontics Restorative Dent. 2011 Apr;31(2):125-31.

Patcas, R., Muller, L., Ullrich, O., & Peltomaki, T. (2012). Accuracy of cone-beam computed tomography at different resolutions assessed on the bony covering of the mandibular anterior teeth. Am J Orthod Dentofacial Orthop, 141(1), 41-50. Januario, A. L., Duarte, W. R., Barriviera, M., Mesti, J. C., Araujo, M. G., & Lindhe, J. (2011). Dimension of the facial bone wall in the anterior maxilla: a cone-beam computed tomography study. Clin Oral Implants Res, 22(10), 1168-1171.