MORPHOMETRIC ANALYSIS OF THE NASOPALATINE CANAL IN THAIS

Introduction

NPC is one of the most important anatomy relevant to the success rate of implant placement in anterior teeth. Its variation among ethnicities have been reported. Then, the aims of this study are to analyze the variation of the nasopalatine canal in Thais and the effect of age and gender to its morphometric variation by using CBCT.

Objective:

- To obtain the linear and volume measurements of NPC in dentate patient
- To determine NPC morphology and volumetric measurements, respectively.Descriptive and inferential statistic were used to present the data.

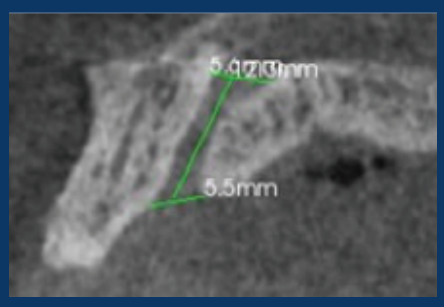

Figure 1: Sagittal Dimension of NPC

Materials & Method

The purposive sampling of 166 CBCT images were selected from Thai patient age 21-80 years. Intraclass correlation were achieved with value >0.8. Descriptive statistics were used to analyze lainear and volume measurement in all orthogonal plane. Inferential statistic will also be analyzed in the relationship with gender, age and root proximity of maxillary central incisors (MCI).

Result

The Sagittal morphology showed significant difference with age and gender ($p < 0.05$). A seventh sagittal morphology was observed as "reverse cone" (3.61%). The higher volume is observed in male ($p < 0.05$). Most axial shape of NPC are "round without separation", and over half of cases have "slanted-straight" canal (54.22%), and "single canal" (63.86%) when viewing in coronal plane. The variable dimension at 4 mm from apex of central incisor ranging from 3.2-9.4 mm. The mean NPC-MCIR, NPC- Buccal bone are not statistically different among gender and age group.

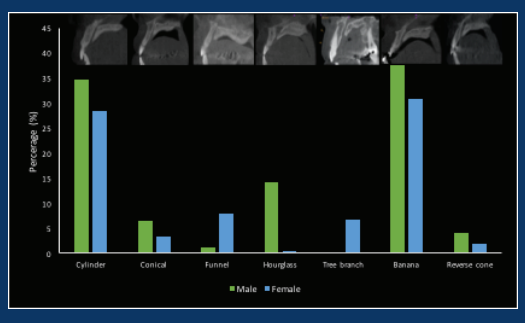

Figure 2: Sagittal Morphology of NPC and Gender

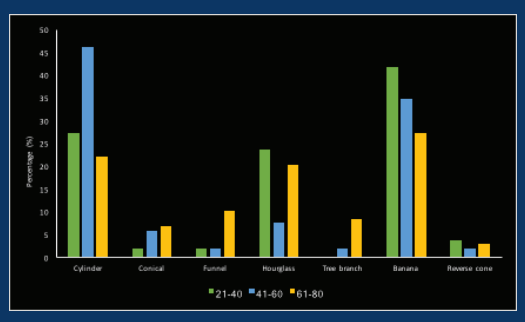

Figure 3: Sagittal Morphology of NPC and Age Groups

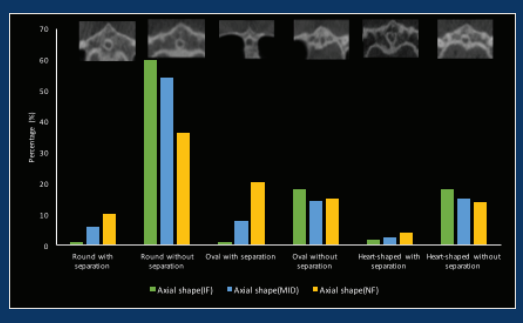

Figure 4: Axial Morphology of NPC

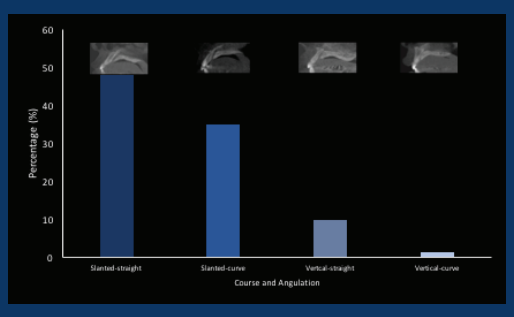

Figure 5: Sagittal Course and Angulation of NPC

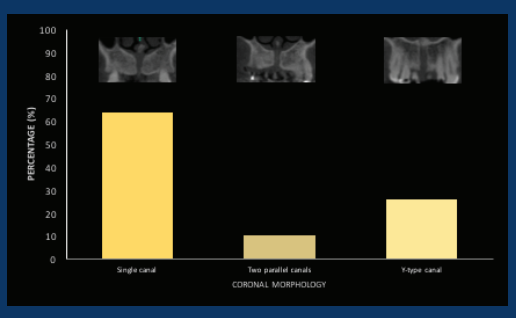

Figure 6: Coronal Morphology of NPC

Conclusion

The present study shows that gender exhibits differences in NPC sagittal morphology and volume. With regards to the anterior maxillary region and NPC, the current study demonstrates variability of the NPC in terms of morphology and dimension; hence, a thorough CBCT analysis is recommended for superior surgical outcomes and to minimize the post-operative complications in implant dentistry or any surgical procedures in the anterior maxillary region.

Figure 8: Volumetric Measurement of NPCs

Table 1: NPC-MCIR and Gender

	Mid root		Apex level	
Gender	11	21	11	21
Men (N = 78)	2.46 (0.93)	2.30 (0.75)	4.75 (1.20)	4.74 (1.24)
Women (N = 88)	2.40 (0.82)	2.38 (0.72)	4.76 (1.32)	4.84 (1.23)
P value	0.63	0.47	0.97	0.61

Table 2: Mean Volume of NPC

	Mean (SD)	Min-Max
Volume	110.13 (4.04)	25.18-316.35

Table 3: NPC Volume and Gender

Gender	Mean (S.D.)	Min-Max	t	P-Value	df
Volume					
Male	120.56 (56.69)	25.18-316.35	2.47	0.015	164
Female	100.89 (45.86)	28.62-251.89			

Figure 7: NPC-MCIR of Tooth 11

Advisor: Dr. Piyanuch Karnasuta, DDS, PhD.

Varot	Vongchoosee	5400097
Marisa	Tangvipattanapong	5700211
Chinda	Suemanotham	5700230
Thanasin	Panmethis	5700241
Trong	Bovornrattanakosol	5706213

1. Acar B, Kamburoglu K. Morphological and volumetric evaluation of the nasopalatinal canal in a Turkish population using cone-beam computed tomography. Surg Radiol Anat. 2015;37(3):259-65.
2. Bornstein MM, Balsiger R, Sendi P, von Arx T. Morphology of the nasopalatine canal and dental implant surgery: a radiographic analysis of 100 consecutive patients using limited cone-beam computed tomography. Clin Oral Implants Res. 2011;22(3):295-301.
3. Etoz, M., & Sisman, Y. (2014). Evaluation of the nasopalatine canal and variations with conebeam computed tomography. Surg Radiol Anat, 36(8), 805-812
4. Fernandez-Alonso, A., Suarez-Quintanilla, J. A., Muinelo-Lorenzo, J., Bornstein, M. M., Blanco-Carrion, A., & Suarez-Cunqueiro, M. M. (2014). Three-dimensional study of nasopalatine canal morphology: a descriptive retrospective analysis using cone-beam computed tomography. Surg Radiol Anat, 36(9), 895-905. doi:10.1007/s00276-014-1297-3
5. Song WC, Jo DI, Lee JY, Kim JN, Hur MS, Hu KS, et al. Microanatomy of the incisive canal using three-dimensional reconstruction of microCT images: an ex vivo study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;108(4):583-90.
6. Thakur, A. R., Burde, K., Guttal, K., & Naikmasur, V. G. (2013). Anatomy and morphology of the nasopalatine canal using cone-beam computed tomography. Imaging Sci Dent, 43(4), 273- 281. doi:10.5624/isd.2013.43.4.273