**Supplementary Table 1.** Cephalometric variables and their definitions.

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| Category | Measurements | Definitions |
| Maxilla to Cranial Base | SNA (˚) | The angle formed by connecting sella, nasion, and A-point |
| SN-Palatal Plane (˚) | The angle formed from the intersection of sella-nasion line and a line drawn connecting anterior nasal spine to posterior nasal spine |
|  | SN-Occlusal Plane (˚) | The angle formed from sella-nasion and occlusal plane |
|  | A-N Perpendicular (mm) | The linear distance from A point to the nasion perpendicular. |
| Mandible to Cranial Base | SNB (˚) | The angle formed by connecting sella, nasion, and B-point |
| SNPog (˚) | The angle formed by connecting sella, naison, and pogonion |
| FMA: MP-FH (˚) | The angle formed from the intersection of porion-orbitale line and a line drawn connecting gonion to gnathion |
| SN-MP (˚) | The angle formed from the intersection of sella-nasion line and a line drawn connecting gonion to gnathion |
| Mandibular Plane to Occlusal Plane (˚) | The angle formed by mandibular plane and occlusal plane |
| B-N Perpendicular (mm) | The linear distance from B point to nasion perpendicular |
| Pog-N Perpendicular (mm) | The linear distance from pogonion to nasion perpendicular |
| Y-Axis: SGn-SN (˚) | The angle formed by connecting nasion, sella, and gnathion |
| Maxilla to Mandible | ANB (˚) | The difference between SNA and SNB |
| Palatal-Mandibular Angle (PP-MP) (˚) | The angle formed from palatal plane and mandibular plane |
| Wits Appraisal (mm) | The distance between A point to occlusal plane and B point to occlusal plane |
| Maxillary Length: ANS-PNS (mm) | The linear measurement between anterior nasal spine and posterior nasal spine |
| Mandibular Length: Co-Gn (mm) | The linear measurement between condylion and gnathion |
| Cranial Base | Cranial Base Flexure Angle: Ba-S-N (˚) | The angle formed by connecting basion, sella, and nasion |
| Upper Incisors to Maxilla | U1-SN (˚) | The angle formed from a line connecting sella to nasion and a line connecting the upper incisor incisal tip to the root apex |
| U1-NA (˚) | The angle formed from a line connecting nasion to A-point and a line connecting the upper incisor incisal tip to the root apex |
| U1-NA (mm) | The linear measurement from the labial surface of the upper incisor to the line connecting nasion to A-point |
|  | U1-Palatal Plane (˚) | The angle formed by the position of maxillary incisor to palatal plane |
|  | U1 Protrusion (U1-APog) (mm) | The distance from maxillary incisor to the A point-pogonion reference line |
| Lower Incisors to Mandible | L1-MP (˚) | The angle formed from a line connecting the lower incisor incisal tip to the root apex and a line connecting gonion to gnathion |
| L1-NB (˚) | The angle formed from a line connecting the lower incisor incisal tip to the root apex and a line connecting nasion to B-point |
| L1-NB (mm) | The linear measurement from the labial surface of the lower incisor incisal to the line connecting nasion to B-point |
|  | L1 Protrusion (L1-APog) (mm) | The distance from mandibular incisor to the A point-pogonion reference line |
| Incisors to Each Other | Interincisal Angle (˚) | The angle formed from a line connecting the lower incisor incisal tip to the apex and a line connecting the upper incisor incisal tip to the root apex |
|  | Overjet (mm) | The horizontal distance from maxillary incisor tip to mandibular incisor tip |
|  | Overbite (mm) | The vertical distance from maxillary incisor tip to mandibular incisor tip |
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| Hard Tissue Upper Face Height: N-ANS (mm) | The linear measurement between nasion and anterior nasal spine |
| Hard Tissue Lower Face Height: ANS-Me (mm) | The linear measurement between anterior nasal spine and menton |
| UFH (N-ANS/(N-ANS+ANS-Me)) (%) | The ratio of the upper face height to facial height |
| LFH (ANS-Me/(N-ANS+ANS-Me)) (%) | The ratio of lower face heigh to facial height |
| Posterior Face Height: Ar-Go (mm) | The linear measurement between articulare and gonion |
|  | PFH:AFH (Co-Go:N-Me) (%) | The ratio of posterior facial height to anterior facial height |
| Profile | Convexity: NA-APog (˚) | The angle formed by connecting nasion, A-point, and pogonion |
| Facial Angle: FH-NPog (˚) | The angle formed from a line connecting porion to orbitale and a line connecting nasion to pogonion |

**Supplementary Table 2.** Intra-examiner repeatability of the measurements.

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| **Measurements** | **Mean** | **SD** | **P-value** | **ICC** |
| SNA (˚) | 0.06 | 0.77 | 0.81 | 0.96 |
| SN-Palatal Plane (˚) | -0.70 | 0.70 | 0.01 | 0.95 |
| SN-Occlusal Plane (˚) | -0.32 | 1.93 | 0.61 | 0.73 |
| A-N Perpendicular (mm) | 0.15 | 1.72 | 0.79 | 0.93 |
| SNB (˚) | 0.11 | 0.73 | 0.65 | 0.95 |
| SNPog (˚) | 0.07 | 0.96 | 0.82 | 0.89 |
| FMA: MP-FH (˚) | -0.01 | 0.99 | 0.98 | 0.98 |
| SN – MP (˚) | -0.36 | 1.58 | 0.49 | 0.94 |
| Mandibular Plane to Occlusal Plane (˚) | 0.33 | 1.86 | 0.59 | 0.88 |
| B-N Perpendicular (mm) | -0.12 | 2.57 | 0.89 | 0.84 |
| Pog-N Perpendicular (mm) | -0.24 | 2.75 | 0.79 | 0.91 |
| Y-Axis (SGn-SN) (˚) | -0.14 | 0.56 | 0.45 | 0.98 |
| ANB (˚) | -0.05 | 0.93 | 0.87 | 0.81 |
| Palatal-Mandibular Angle (PP-MP) (˚) | 0.72 | 1.28 | 0.11 | 0.97 |
| Wits Appraisal (mm) | 0.29 | 1.69 | 0.60 | 0.90 |
| Maxillary length (ANS-PNS) (mm) | 0.79 | 2.40 | 0.33 | 0.96 |
| Mandibular length (Co-Gn) (mm) | -1.90 | 4.80 | 0.24 | 0.97 |
| Cranial Base Flexure Angle: Ba-S-N (˚) | 0.53 | 1.11 | 0.17 | 0.97 |
| U1 – SN (˚) | 1.45 | 2.31 | 0.08 | 0.96 |
| U1 – NA (˚) | 1.39 | 2.70 | 0.14 | 0.94 |
| U1 - NA (mm) | 0.22 | 1.22 | 0.58 | 0.90 |
| U1 - Palatal Plane (˚) | 0.75 | 2.07 | 0.28 | 0.98 |
| U1 Protrusion (U1-APog) (mm) | 0.25 | 0.67 | 0.27 | 0.98 |
| L1 – MP (˚) | 2.01 | 3.90 | 0.14 | 0.38 |
| L1 – NB (˚) | 1.85 | 4.18 | 0.20 | 0.78 |
| L1 - NB (mm) | 0.44 | 0.65 | 0.06 | 0.96 |
| L1 Protrusion (L1-APog) (mm) | 0.50 | 0.71 | 0.05 | 0.97 |
| Interincisal Angle (˚) | -2.71 | 5.35 | 0.14 | 0.91 |
| Overjet (mm) | -0.26 | 0.44 | 0.09 | 0.99 |
| Overbite (mm) | -0.04 | 1.09 | 0.91 | 0.86 |
| Hard Tissue Upper Face Height (N-ANS) (mm) | -0.73 | 1.37 | 0.13 | 0.99 |
| Hard Tissue ower Face Height (ANS-Me) (mm) | -0.97 | 2.00 | 0.16 | 0.99 |
| UFH (N-ANS/(N-ANS+ANS-Me)) (%) | 0.08 | 0.60 | 0.68 | 0.88 |
| LFH (ANS-Me/(N-ANS+ANS-Me)) (%) | -0.08 | 0.60 | 0.68 | 0.88 |
| Posterior Face Height (Ar-Go) (mm) | -0.81 | 2.34 | 0.30 | 0.94 |
| PFH:AFH (Co-Go : N-Me) (%) | -0.43 | 3.20 | 0.68 | 0.61 |
| Convexity (NA-APog) (˚) | 0.06 | 2.50 | 0.94 | 0.81 |
| Facial Angle (FH-NPog) (˚) | -0.19 | 1.28 | 0.65 | 0.90 |

Supplementary Table 3. The descriptive statistics of the cephalometric measurements at T1, T2, and T3, including mean, standard deviation, and minimum/maximum values.

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|  | **T1** | | | | **T2** | | | | **T3** | | | |
| **Measurements** | **Mean** | **SD** | **Min** | **Max** | **Mean** | **SD** | **Min** | **Max** | **Mean** | **SD** | **Min** | **Max** |
| SNA (°) | 81.50 | 3.42 | 73.50 | 89.50 | 81.98 | 3.38 | 75.20 | 91.50 | 82.26 | 3.52 | 73.60 | 93.10 |
| SN-Palatal Plane (°) | 6.81 | 3.39 | -2.40 | 14.50 | 6.72 | 3.34 | -2.40 | 14.70 | 6.47 | 3.45 | -1.60 | 14.50 |
| SN to Occlusal Plane (°) | 16.31 | 3.92 | 6.70 | 25.10 | 14.60 | 4.26 | 4.00 | 26.40 | 13.51 | 4.18 | 1.90 | 26.20 |
| A-N Perpendicular (mm) | -1.20 | 3.69 | -15.60 | 7.70 | -1.17 | 3.75 | -12.20 | 9.90 | -1.09 | 4.35 | -14.10 | 10.70 |
| SNB (°) | 77.30 | 3.11 | 69.80 | 84.40 | 78.09 | 3.15 | 70.60 | 85.30 | 78.77 | 3.33 | 70.40 | 87.20 |
| SNPog (°) | 78.48 | 3.18 | 70.80 | 85.40 | 79.50 | 3.31 | 71.10 | 88.10 | 80.45 | 3.47 | 71.20 | 89.80 |
| FMA: MP-FH (˚) | 26.73 | 4.84 | 16.80 | 42.60 | 26.31 | 4.94 | 14.20 | 40.60 | 25.45 | 5.24 | 12.70 | 38.20 |
| SN – MP (°) | 31.70 | 4.74 | 21.40 | 42.00 | 30.81 | 5.00 | 20.80 | 42.50 | 29.81 | 5.07 | 17.70 | 41.80 |
| Mandibular Plane to Occlusal Plane (°) | 16.37 | 3.70 | 8.40 | 25.90 | 17.06 | 4.08 | 6.70 | 29.50 | 17.08 | 4.34 | 4.50 | 28.50 |
| B-N Perpendicular (mm) | -8.84 | 5.51 | -27.40 | 4.60 | -8.56 | 5.79 | -24.40 | 10.60 | -7.93 | 6.85 | -23.10 | 10.20 |
| Pog-N Perpendicular (mm) | -7.98 | 6.47 | -29.20 | 6.80 | -7.15 | 6.89 | -25.50 | 14.50 | -5.80 | 8.10 | -24.20 | 16.90 |
| Y-Axis (SGn-SN) (°) | 67.32 | 3.34 | 59.90 | 75.00 | 67.18 | 3.50 | 56.60 | 75.40 | 66.84 | 3.60 | 55.00 | 75.30 |
| ANB (°) | 4.19 | 1.92 | -0.80 | 11.10 | 3.89 | 1.85 | -0.30 | 8.50 | 3.48 | 2.02 | -1.00 | 8.00 |
| Palatal-Mandibular Angle (PP-MP) (°) | 25.87 | 5.06 | 14.80 | 41.70 | 24.94 | 5.06 | 14.20 | 39.80 | 24.10 | 5.04 | 12.20 | 40.50 |
| Wits Appraisal (mm) | 1.82 | 2.57 | -5.00 | 8.50 | 2.18 | 2.71 | -5.30 | 10.10 | 2.16 | 2.73 | -5.30 | 9.20 |
| Maxillary length (ANS-PNS) (mm) | 52.28 | 3.33 | 41.80 | 59.90 | 54.36 | 3.65 | 45.90 | 64.80 | 56.39 | 3.61 | 48.60 | 68.40 |
| Mandibular length (Co-Gn) (mm) | 107.19 | 6.26 | 89.90 | 124.20 | 122.30 | 7.12 | 101.10 | 139.90 | 128.08 | 7.65 | 105.70 | 147.40 |
| Cranial Base Flexure Angle: Ba-S-N (˚) | 128.49 | 5.19 | 110.80 | 141.30 | 128.51 | 5.15 | 115.90 | 138.80 | 128.14 | 5.32 | 113.40 | 140.00 |
| U1 – SN (°) | 103.24 | 8.35 | 83.30 | 124.30 | 103.23 | 8.67 | 79.60 | 123.40 | 103.19 | 8.88 | 76.30 | 122.40 |
| U1 – NA (°) | 21.74 | 8.43 | 2.40 | 43.80 | 21.25 | 8.88 | 0.50 | 45.30 | 20.94 | 8.77 | -0.50 | 43.30 |
| U1 - NA (mm) | 3.96 | 2.82 | -2.30 | 12.30 | 4.20 | 2.98 | -1.80 | 12.30 | 4.36 | 3.11 | -2.80 | 13.50 |
| U1 - Palatal Plane (°) | 110.05 | 7.31 | 92.90 | 133.80 | 109.95 | 7.95 | 90.50 | 131.20 | 109.67 | 7.97 | 86.90 | 132.90 |
| U1 Protrusion (U1-APog) (mm) | 6.49 | 2.90 | -3.80 | 14.40 | 6.34 | 3.01 | -3.90 | 12.50 | 5.96 | 3.10 | -4.80 | 13.00 |
| L1 – MP (°) | 94.86 | 6.06 | 78.00 | 112.20 | 94.97 | 5.90 | 78.10 | 111.70 | 94.70 | 6.33 | 75.10 | 111.50 |
| L1 – NB (°) | 26.16 | 6.13 | 4.30 | 39.70 | 26.24 | 6.34 | 6.00 | 38.40 | 25.62 | 6.68 | 3.00 | 41.00 |
| L1 - NB (mm) | 4.60 | 2.11 | -2.30 | 10.00 | 4.85 | 2.28 | -1.70 | 10.20 | 4.93 | 2.46 | -2.90 | 11.20 |
| L1 Protrusion (L1-APog) (mm) | 1.17 | 2.30 | -6.40 | 6.80 | 1.28 | 2.55 | -6.70 | 7.20 | 1.29 | 2.69 | -8.80 | 7.10 |
| Interincisal Angle (°) | 127.90 | 11.11 | 106.30 | 167.90 | 128.62 | 12.28 | 106.40 | 165.60 | 129.94 | 12.15 | 108.80 | 172.00 |
| Overjet (mm) | 5.42 | 2.40 | 1.20 | 13.30 | 5.14 | 2.13 | 0.80 | 12.80 | 4.80 | 2.09 | 0.10 | 11.10 |
| Overbite (mm) | 3.15 | 2.06 | -5.20 | 7.10 | 3.12 | 2.13 | -6.60 | 7.60 | 2.97 | 2.27 | -5.10 | 7.40 |
| Hard Tissue Upper Face Height (N-ANS) (mm) | 51.52 | 3.42 | 42.50 | 59.40 | 54.12 | 3.61 | 46.60 | 64.20 | 55.98 | 3.80 | 47.20 | 65.20 |
| Hard Tissue Lower Face Height (ANS-Me) (mm) | 64.19 | 4.98 | 53.70 | 85.20 | 67.68 | 5.27 | 59.00 | 89.20 | 70.82 | 5.47 | 60.60 | 94.60 |
| UFH (N-ANS/(N-ANS+ANS-Me)) (%) | 44.57 | 1.98 | 40.40 | 50.00 | 44.46 | 1.90 | 39.40 | 48.70 | 44.18 | 1.98 | 39.20 | 48.30 |
| LFH (ANS-Me/(N-ANS+ANS-Me)) (%) | 55.50 | 2.04 | 50.00 | 61.40 | 55.54 | 1.90 | 51.30 | 60.60 | 55.82 | 1.98 | 51.70 | 60.80 |
| Posterior Face Height (Ar-Go) (mm) | 42.83 | 3.91 | 33.20 | 53.40 | 46.28 | 4.66 | 34.00 | 56.50 | 49.63 | 5.41 | 35.30 | 61.70 |
| PFH:AFH (Co-Go : N-Me) (%) | 54.75 | 3.53 | 45.40 | 62.70 | 55.35 | 4.05 | 45.30 | 66.10 | 56.48 | 3.74 | 48.10 | 66.60 |
| Convexity (NA-APog) (°) | 6.47 | 4.69 | -7.90 | 22.50 | 5.22 | 4.68 | -7.50 | 17.70 | 3.80 | 4.89 | -6.10 | 17.20 |
| Facial Angle (FH-NPog) (°) | 85.70 | 3.47 | 74.00 | 93.90 | 86.38 | 3.53 | 76.00 | 97.20 | 87.15 | 4.04 | 77.00 | 98.40 |